THE AMATEUR

POTTERY AND GLASS PAINTER.

THE

AMATEUR POTTERY & GLASS PAINTER,

WITH DIRECTIONS FOR

GILDING, CHASING, BURNISHING, BRONZING AND GROUNDLAYING.

E. CAMPBELL HAND

ILLUSTRATED

Including Fac-similes from the Sketch Book of N. H.

WITH AN APPENDIX

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Preface.

IN the following pages it is the wish of the writer to give an accurate and satisfactory account of the means to be employed to become proficient in the arts of pottery and glass painting. It is hoped that the work will prove of interest alike to the art-student, the professional artist or teacher, and to the general public; for while the student is initiated into the "mysteries of the craft," the teacher may be glad to place in the hands of his pupils trustworthy information for reference in the intervals of his lessons, and the public generally have lately manifested a growing interest in the subject, especially since it has become widely known by means of many exhibitions of amateurs' paintings which have been held in London and elsewhere—encouraged in some instances by the patronage of royalty itself.

The development of the art is largely due to

the judicious teaching which has been freely diffused by the Department of Science and Art through their museums at South Kensington and its affiliated institutions. It is only right to acknowledge the author's indebtedness to the officials at South Kensington Museum, Mr. Thompson, Mr. Wallace and Mr. King, through whose kindness and courtesy he has been enabled to obtain the special permission of the Department to re-print a comprehensive and valuable history of "Pottery and Porcelain," which forms the appendix to this little work. To Mr. John Haslem of Derby, the well known authority in old china matters, the writer's acknowledgments are also due for assistance derived from his interesting work "The Old Derby China Factory." Messrs. Howell and James the writer also wishes to thank for the use of the engravings of prize plaques, which are inserted in order to show what amateurs can do with the encouragement of a healthy competition. While speaking of illustrations, it may be well to say that it was only at the last moment thought necessary to illustrate in some slight way the "Amateur Glass Painter," in order that readers might have some idea of the distinctive peculiarities of various centuries of glass painting. Such illustrations could not possibly have been procured at so late a stage, had it not been for the kindness of Mr. N. H. J. Westlake, F.S.A.,

the well known artist and authority upon stained glass—who, when the writer explained the difficulty to him, at once most generously placed fac-similes of his own sketch book, together with the valuable notes appended, in his hands. The haste with which this was done will account for the crudeness of the descriptions of these illustrations. It is also the writer's duty, as well as pleasure, to publicly acknowledge here his obligation to his friend Mr. Edmund Powell, who, from a long connection with the editorial staff of the *City Press*, has been able to render him valuable assistance in revising the matter while passing through the press.

Many productions have been issued upon this subject, but they have been mostly partial and unsatisfactory: the attempts of one writer to be concise rendering his labours barren; while another's voluminous histories of art have been put aside by the genuine student, who seeks, chiefly, practical information. The writer is well aware that he has been obliged to tread, to a certain extent, in the steps of those who have gone before him. While acknowledging this, he trusts that their labours will find elucidation in his own, which are the outcome of the experience of five generations. He may be pardoned for referring with some pride to the fact that since John Hancock mixed Wedgwood's "bodies" and made his colours, one hundred

and twenty years ago, up to the present time, his family has been uninterruptedly connected with the art in all its branches. Indeed, the present hand-book is chiefly intended to supersede the necessity of replying to correspondence, which has come to the writer's works from all quarters of the globe since his first introduction of specially prepared colours for amateurs.

Therefore with all confidence he places his book before the public; and for whatever observations the friendly critic or professional artist may make, he will show himself grateful in future editions.

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APPENDIX: POTTERY AND PORCELAIN.

" Until a recent period, 'painting on china' was exclusively the employment of men ; not long ago, in the factories of Staffordshire, women were forbidden, by selfish and cruel 'trade laws,' to place the brush on any piece except the very commonest. There are no rare productions of the potter in past times—certainly none of English produce—that can be traced to the delicate, skilful, and powerful hands of women labourers in this productive vineyard. 'China collectors' can show us none. It is only within a very recent period the obvious truth was accepted, that among employments more especially suited to women (for which the thoughtful, benevolent, and merciful are eagerly seeking), there is none so peculiarly appropriate or so assuredly remunerative. It infers, generally, home employment; it is not continuous and overfatiguing ; the models are chiefly those that are supplied by Nature —flowers, and leaves, and grasses, and so forth ; it is work alike for the humblest art student and loftiest art lover—the gift is a gift that elevates both ; it is not requisite that to be successful the power of production should be of the very highest order : the best will always attain pre-eminence, but works above mediocrity will attract and charm, and employment be assured of a larger or lesser recompense ; while as employment merely it is pleasant as well as profitable."—*Social Notes.*

The Amateur's Sphere of Work.

THE great interest which has of late years been taken in the subject of pottery painting has been already noted in the preface to this small work, which is designed to answer the inquiries constantly made as to the nature of ceramic colours and the methods of using them.

Many people suppose that the processes necessary to produce a successful piece of pottery painting are out of the reach of amateurs, and that the difficulties of manipulation are insurmountable; but these difficulties may be readily overcome by adhering to the simple instructions here laid down. The practice of pottery painting will then become as easy of accomplishment as any other methods of painting; over all of which it possesses this great advantage—that the pictures, being fixed by burning, will not fade, but are as permanent as the piece itself on which the work is executed.

Let the student begin with very humble expectations; anticipating disappointments, but being fully

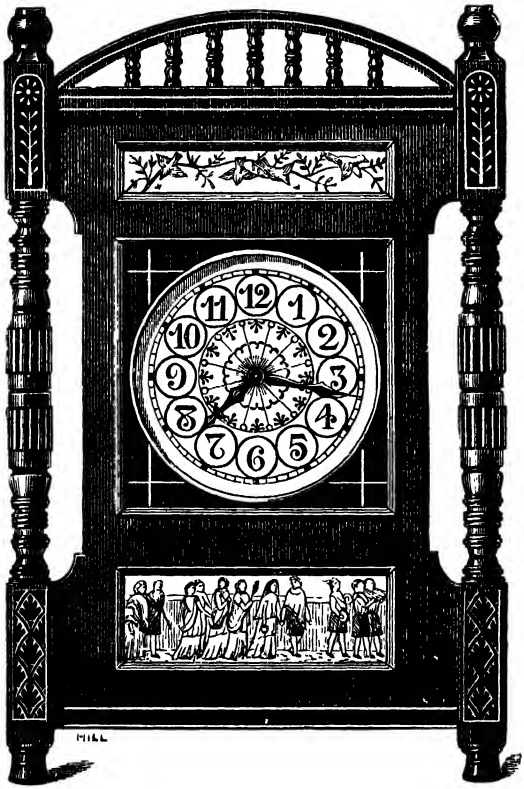
prepared to meet them as they arise, by having carefully read and re-read his instructions. Let him hail with delight even gradual improvement; remembering that years of patient study alone can produce perfection in any art.

It is necessary, however, to have a clear understanding as to what amateurs can do with advantage, and what they cannot. The great advantage which amateur work has over manufactured productions is in those pieces demanding a great expenditure of the time which the amateur has freely at disposal, but which would become very costly if produced in a factory.

In cases where it is desired to have some special subject—such as a private portrait, or any other subject of limited interest only—it is obvious that the advantage is wholly on the side of the amateur. It only answers to produce in a manufactory those subjects which are likely to prove of general interest and command a ready sale. At the same time the amateur should bear in mind that it is mere waste of time to attempt work which can be much better done in the workshop. Cups and saucers, plates and dishes, and all such articles, can be produced far more effectively, and at much less cost, by the professional potter than by any amateur.

Following up the suggestion that amateurs should devote themselves to special work only, it is easy to indicate some of the things which may be advantageously undertaken by them. Amateurs have the opportunity of decorating their houses in a manner

which would be impossible had the works to be purchased. The writer hopes the day is not far distant when, instead of so many of our middle-class houses looking like nothing so much as the



specimen drawing-rooms set out in the upholsterers' windows, each home will bear traces on all hands of the special tastes of its members. As we enter such a house, our eye catches a tasteful little design

on the drawing-room door-plate, instead of a mere slab of white china with the conventional gilt wreath. On the walls are some pictures, the peculiar translucence of which proclaims that they are painted on the imperishable porcelain. A decorative cabinet, which the next-door neighbour would not venture to buy, because of the cost of its inlaid china tablets, has been readily procured here because the daughters of the house have painted the tablets themselves. On the shelf is a dainty time-piece, inlaid still with "the girls'" work. We take a turn in the conservatory, and are struck with the beauty of the floral devices on porcelain which adorn the walls — all painted at home, as we learn in the half-hour's chat to which all these pretty little indications of good taste give rise. Here, on a plaque, is an idealised sketch of the nook down a neighbouring lane; and that little vase is beautified with no fancy head other than "baby's," or some little sister's. Thus, instead of

one's friends turning wearily from well-known devices which they might just as readily see in the shop windows, and which they have already seen in a hundred other houses, they meet at every turn with the individualized and highly finished work which, it has already been said, is the true sphere of the amateur, who should be as readily recognised by his painting as by his handwriting.

Amateur work need not be confined to pottery alone. It may be applied, for instance, to stained glass, which is now often inserted in windows for the purpose of blocking out many of the unpleasant sights too frequently seen from the back windows of our houses, particularly in London. And not only may art thus be brought in to relieve us from a dreary outlook; for sunlight itself, instead of being treated as a mere convenience, may be made to minister to the beauty of our surroundings, and thus soothe the spirits. Milton well knew, two hundred years ago, the influence of the "dim religious light" of our cathedrals; and there is no doubt that very much of the pervading calm of such buildings—which in these days is felt to be all the greater by contrast with the restless excitement of the world outside—is due to the calm and subdued light which steals through the painted windows. In a minor degree there is no doubt that something of the same kind might be done—as indeed it is done in many cases—in our dwellings. This is a mere suggestion as to one of the many applications of art in the household, amongst which pottery painting and its allied

arts should hold a far more prominent place than they have hitherto held.

Here is surely a more profitable occupation for our young ladies than the endless production of the piles of needlework to which at present their talents are too often exclusively confined. Moreover, pottery painting affords a profitable resource for those whose circumstances necessitate their making some contribution to the household expenses. Most young ladies have already learned, as a part of their general education, the *technique* of drawing and water-colour sketching; but these accomplishments are frequently cast aside for want of some new direction, less suggestive of the schoolroom, in which to exercise them.

There are few things which awaken pleasanter sensations, and give rise to more true sociability, than to enter a room where tasteful ornamentation has been judiciously employed. It must not, however, be overcrowded; for the writer would be the first to deprecate an excess of pottery or any other special feature.

Cannot the daughters of England help their fathers in their too often exhausting labours by such means? And what payment so sweet as the quiet smile with which the over-wrought merchant or professional man greets his daughter as he returns from his day of worry, and finds her busy fingers have been thus ministering to his comfort! Will not the memory of such a daughter be sweet to the father after she has left his roof—as he gazes fondly upon the results of her forethought and skill?

The Three Kinds of Ceramic Painting.

THE student has been enabled within the last few years to apply himself at once, with the requisite materials in his hands, to his legitimate work—viz., painting; as the pottery manufacturer and the ceramic chemist have relieved him of the necessity of preparing and adapting his colours to the wares himself.

The pottery—glazed and unglazed—and the colours specially adapted to their respective peculiarities, may all now be easily procured ready for immediate use.

All the colours used for pottery painting are obtained from metallic oxides, and require to be submitted to different degrees of heat according to their nature and the use to which they are to be applied, in order to fix them to the wares and bring out their different tints.

There are three distinct methods of painting and decorating pottery wares:—

Enamel or "overglaze" painting,
Underglaze or "biscuit" painting,
Majolic adecoration with coloured glazes;

and the colours adapted to each method are totally different from each other. They must therefore be kept quite distinct and separate, and must in no case be used with, for, or over each other, without previous firing; and even then only under special circumstances, which will be explained hereafter.

Enamel Painting is done on the glazed surface. The colours are all made to fuse at the same degree of heat, and are all perfectly bright, pure, and glossy, when fired. Repeated burnings do not affect them, provided the proper heat is not exceeded, and sulphur in the kiln has not been encountered. There is some risk of this accident at every burning; nevertheless, with proper care, most elaborate work can be accomplished, and the colours will all be bright when the work is completed.

Underglaze Painting is done on the "biscuit" surface of the wares, and the glaze is laid over the colours. The wares must then be fired in a potter's "glost-oven," the heat of which is considerably greater than the enamel kiln heat. Underglaze colours are prepared for this special purpose, and to stand the much greater degree of heat to which they must be subjected.

Majolica Painting is done with coloured glazes all made to fuse together at a special heat, and worked upon the "biscuit" surface. When properly fired,—which must be done at a manufactory,—they present a beautiful, lustrous appearance.

The nature and uses of the various colours will be described in the order indicated above.

Implements and Materials.

THE absolute requisites for the china painter are not very numerous. The undermentioned articles will form a sufficient stock for the amateur.

Colours,	A painting table,
Mediums or vehicles,	An easel,
Pencils or brushes,	Mahl stick,
Palette knives,	Wheel for circles,
Glass mullers,	Plaques, ornaments, etc.,
Palettes,	etc., to paint upon.

Even all of these are not absolutely necessary; and in order to facilitate the student's choice, they will be described briefly.

Colours.—A selection should be made from the colours of some well-known maker, all of which should, if good, fuse together at the same temperature. A high authority, writing on this subject, says,—

"Many potters do not prepare their own enamel colours, but purchase what they require from persons who manufacture them for sale. Some of these preparations are exceedingly costly; and as the temptation to adulterate them is consequently great, the potter should have good reason to rely on the probity of the colour manufacturer with whom he deals. A fraudulent mixture, the detection of which would be impossible before its use, except by means of a chemical analysis, might be the occasion, in its results, of severe loss and disappointment."

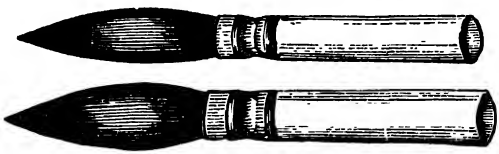
The selection of colours may consist of any number from twelve to forty; the former will be a limited supply, the latter sufficient to enable the student to follow out his studies to the end.

Mediums or Vehicles.—These are of considerable importance, and are somewhat diversified to suit the whims and fancies of various artists. Those, however, which have stood the test of many years' experience are Turpentine, Fat Oil, and Rectified Spirits of Tar; and the student who does not wish to court difficulties is recommended to use these alone. It is, however, essential that these should be of the very best quality; and with them, as with most other things, the cheapest are *not* the best. Faults in the picture sometimes develop in the firing which the student is at a loss whether to attribute to himself, the colour, or the kiln. They are very frequently, as the writer has himself experienced, the result of having used bad vehicles.

Pencils or Brushes.—Some have said, "Use sable brushes for enamel painting": the usual practice in manufactories is to use camel-hair brushes of the

best quality, with sometimes a very small fine sable for finishing touches. The writer recommends these to the amateur; and in order to facilitate his choice, introduces a few woodcuts of those shapes and sizes suitable for special work.

Enamel Painting Brushes.



1. Large shaders.

2. Medium shader.

Rose Pencils.

3. Ordinary rose brush.

11. Special rose brush.

Small rose brush

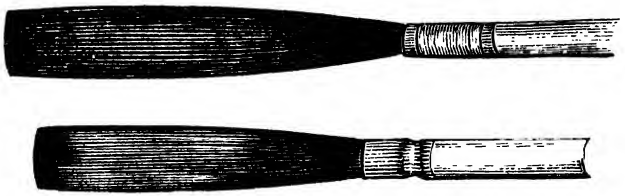
4. Small finisher

6. Small liner.

5. Large liner.

7. Small tracer.

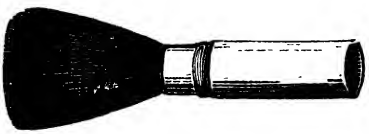
14. Large tracer.



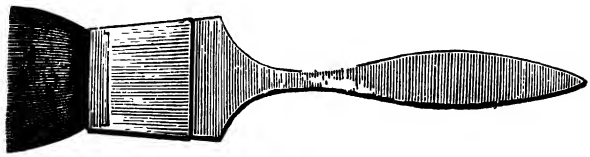
Banding brushes—sometimes used. (Nos 5 and 6 answer the same purpose with a little practice.)

13 General brush.

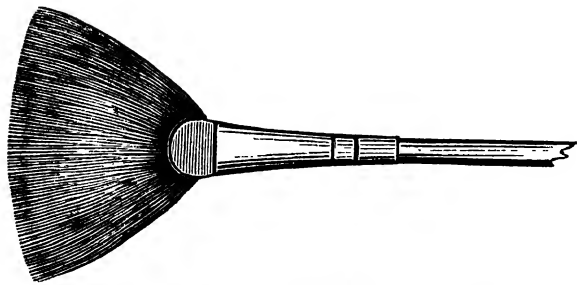
Badger softener.



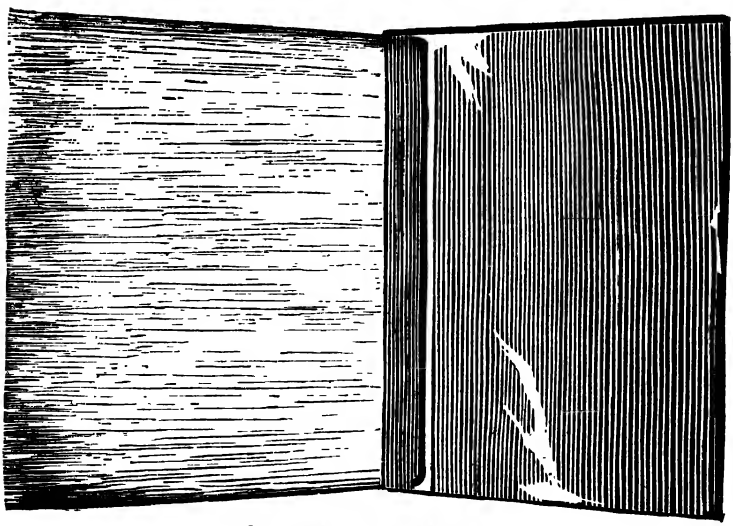
Camel-hair softner.



Camel-hair softener—flat.



Fan shaped brush, nog hair for underglaze, camel hair for enamel.

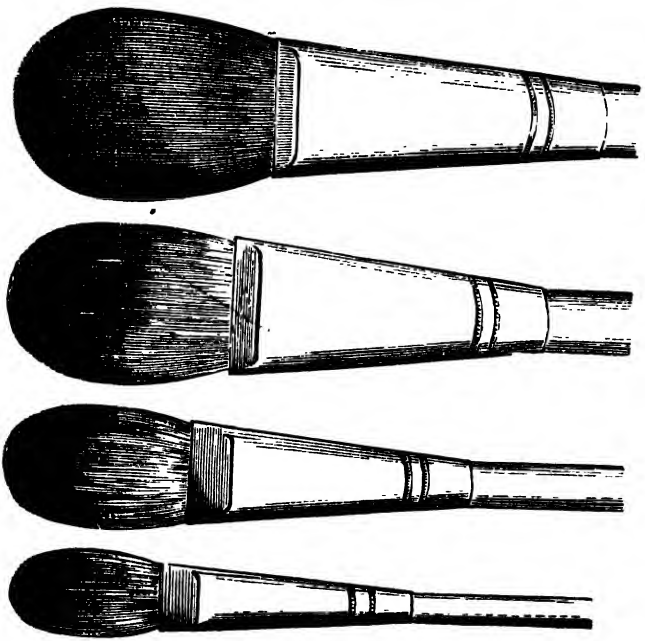


Groundlayer' brush, large size.

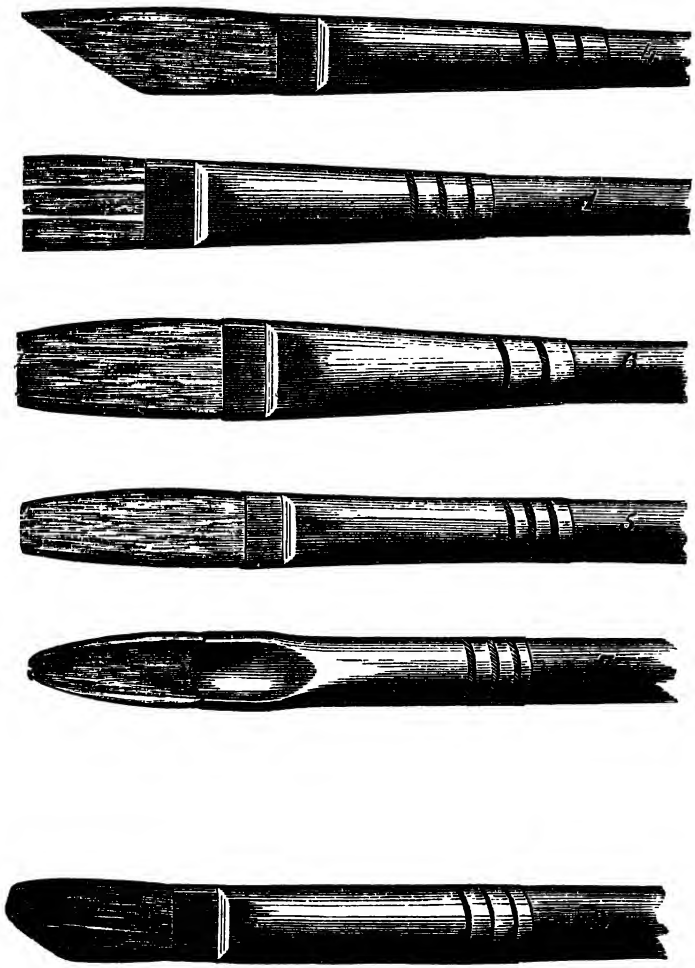
Groundlayer's brush seen in section.

Groundlayer's brush, showing handle complete.

Underglaze Painting Brushes.



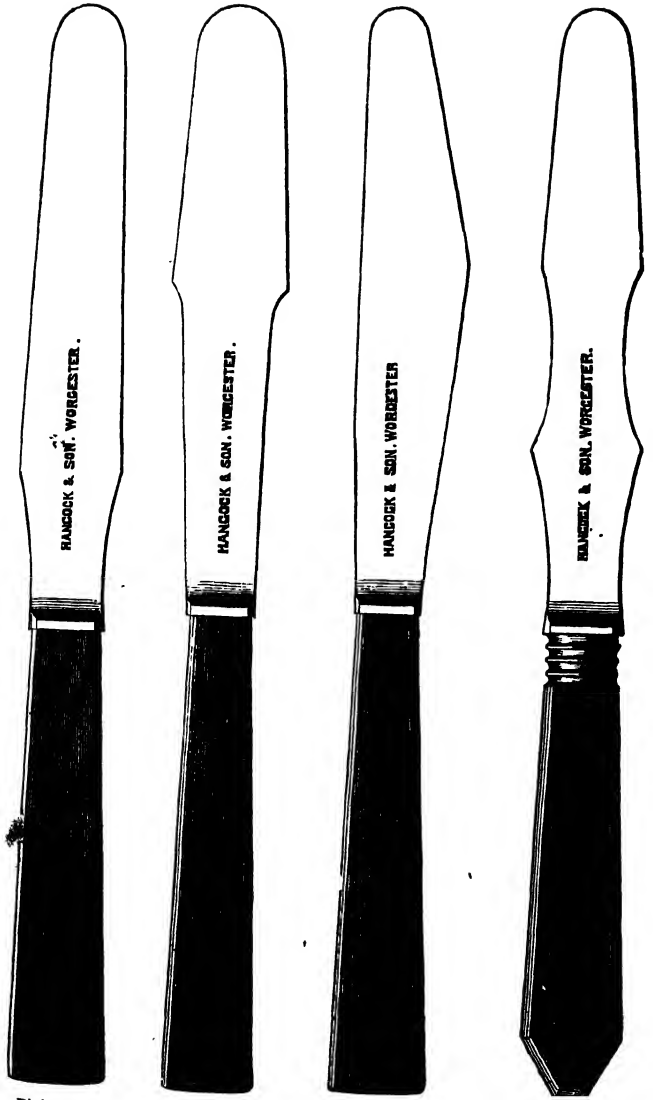
Hog-hair brushes for underglaze work, specially made for skies and water.



Hog-hair brushes—specially prepared to represent brushes which have been used: all very useful for underglaze work, with camel-hair brushes for finishing.

Palette Knives are required for scraping up colour, not grinding it. Some use the knife blade for rubbing the colour fine while adding the vehicles: this, if ever done, should be done with great care, as some colours would be spoiled by it, imperceptible portions of iron being removed and mixed with the colour in the act, which, combining with the fluxes, alter the tint. The best palette knives in the long run are the cheapest. Those best suited for the china painter are about three inches long; they should have a balanced handle, as this saves the blade getting dirty when placed on the table. Knives with use get sharper, or rather narrower, at the point, and the knife most useful is that which is half worn out; there is a knife known as the "askew point" which represents this, and the writer strongly recommends it. Palette knives specially designed by the writer may be obtained in various styles — from the cocoa-handle plain blade, at about *8d.* or *1s.*, to the beautifully finished and carved ivory-handled at about *2s. 6d.*

Mullers.—These are very serviceable articles for grinding or rather mixing the colours with. The specially prepared amateurs' china colours are finely ground by heavy steam machinery, and reduced to an impalpable powder—thereby reducing the trouble of mixing to a minimum. When adding the vehicles, however, the colour appears for the moment somewhat rough; a slight rub with the glass muller removes this at once, when it may be scraped up for use. Hardly enough can be said of their usefulness;



Plain Blade.

Long Shank. (No. 6.)

Askew Blade. (No. 7.)

Double-hollow Shank. (No. 8)

they prevent the necessity of rubbing with the knife, and the consequent danger, as before mentioned. Mullers should be kept perfectly clean, and always wiped at once after use. They are made in various sizes; for small work the most serviceable size is about one inch diameter.

Palettes.—Various and complicated articles have been used for this purpose; nothing, however, can ever supersede, for practical use, the old slab of plate glass, nicely ground at its edge, and having a white paper back. Two or three should be procured, of various sizes. Grounded glass is not desirable, —it is *too* rough. The best preparation is to put on the smooth surface of the glass a little fine sand, adding a little water, and grinding for a few minutes with the muller.

Painting Table.—This should be of well-planed wood, eighteen inches wide by any number of feet in length—according to the space available, and the amount of work contemplated,—and one inch thick. It should be placed in front of a window, and fixed firmly, to ensure steadiness. It should have an

Arm Rest.—This is a smooth board six to eight inches wide, by eighteen to twenty-four inches long, and three-quarters of an inch thick, through one end of which passes a long screw or bolt, the head being on the top of the rest, in which it is counter-sunk, and the screw passing through the table, to which it is loosely secured by a nut. The screw or bolt should be an inch or two longer than the united thickness of rest and table, in order

that the nut may be slackened out—thus permitting the rest to drop from the horizontal as the height of the operator or the circumstances of his work may demand. It will be found useful to have two thin pieces of iron, about six or eight inches long, and say one eighth thick, screwed on the top, and of just sufficient width to allow the palette to be slipped between. This prevents the necessity of holding the palette with the left hand when mixing up colours. A very useful adjunct to the arm rest is a

Finger Rest.—This consists of a short piece of wood, a quarter of an inch thick and six or eight inches long, well smoothed, secured by a screw at one of its ends to the top of the arm rest on its left side, about eight inches from the table. This rest will be found to give great steadiness to the hand, particularly when working on the centre of a large plaque. When not required, it may be pushed aside, and though lying on the arm rest will not interfere with one's comfort.

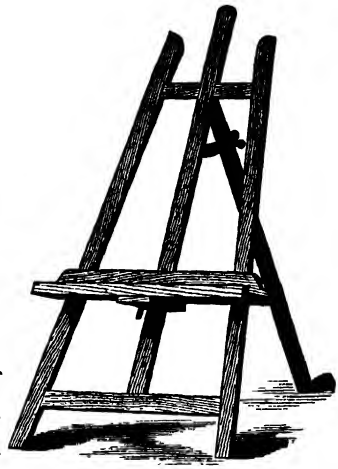
It may not be out of place here to describe the mode of painting from this table and rest. The plaque or article to be painted should be held in the left hand, and placed under the arm rest against the table, in order to steady it. The palette and mediums can be kept upon the rest—the latter in small pots placed in a saucer, having another saucer to invert upon them when not in use. If a vase is the article in hand, a small bar of round wood is sometimes used inside the vase, the outer end of the

wood resting upon the table; or a peg of wood may be fixed into the front edge of the table, readily removable at pleasure, on which the vase may be supported while painting. Either of these methods will be found to remove much of the inconvenient weight from the left arm and hand of the operator, and enable him to paint up to the top of the article without danger of rubbing his work. In addition to the above rests, there is another kind in use which prevents the necessity of cutting a hole in the table. It is called a

Table Rest.—This is simply a narrow piece of wood of any length—perhaps eighteen inches will be found the most useful size—and two or three inches wide, having two blocks the same width, one at each end. This simply bridges over the plaque, and affords support to the wrist. It is a convenient article, but necessitates a stooping position: this can be avoided by using the arm rest, which is in every way the best. If painting a large plaque or set of tiles for mural decoration, or if the subject demands that it be placed upright before the eye, some other means must be taken to support it. For this, there appears to be nothing much better than a

Table Easel.—The selection of this article may safely be left to the artist and the artists' colourman. At the request of some of his amateur friends the writer has designed a special amateur table easel for painting plaques, with an arrangement for keeping them steady. It is similar in form to the accompanying woodcut—which, however, cannot be made

to show the before-mentioned arrangement; it can be obtained at a cheap rate in white wood, or at a little increase of cost in mahogany. If an easel is used, a



Mahl Stick will be necessary to steady the hand. This article is, however, so well known that a description is hardly required. The only other implement to be noticed is the

Wheel.—Many kinds of wheels have been made for the purpose of describing circles and lines. We have seen very pretty ones, known as table wheels, but they only serve one purpose; therefore the one which has been for years and is now in general use will alone be described. It is a horizontal disc or round table of wood about ten inches in diameter, in which is fixed an iron socket, which revolves upon a pivot secured in a stand by means of a thumb-screw, which affords a ready means of raising or lowering the table, to suit the height of the operator or the necessities of the work in hand. This instrument is perhaps somewhat primitive and heavy, but it is cheap and exceedingly durable. As the mode of using it may not be generally known, it may be explained that the plate or article to be lined is placed as near the centre of the wheel as can be

judged. The wheel is then turned with the left hand towards the body, the edge of the plate being gently tapped with a finger of the left hand, until it is exactly true. This can be determined with certainty by holding a pencil or stick to its edge with the right hand, the arm being on the arm rest to steady it. Some practice will be required in order to accomplish this easily and quickly; and it should be tried at first with a valueless article, as probably in the first essays it will fly from the wheel. The article being centred, the brush must be well charged with colour—a brush known as a liner must be alone used—up to the quill, and gently but firmly held upon the plate, the wheel of course being carefully turned with the left hand. Circles can thus with a little practice easily be made.

Plaques,—round, oblong and oval,—bottles, vases, plates, etc., can all now be readily obtained, either glazed or in a biscuit state; any piece of china, however, will do to practise upon in order to get into the use of the colour and the method of working; and the painting, if not satisfactory, may be rubbed off; but it is not safe to paint upon a piece of ware which has been in domestic use with a view of submitting it to the action of the kiln, as most probably it would become black and rough, and the work would be lost. It is necessary to have new clean ware for the purpose; and care must be taken to clean it thoroughly from all marks of colour, etc., before sending it to be burned, as smears of coloured dirt will show when fired, and the work will appear slovenly.

Description of Enamel Colours.

AS we have already mentioned, colours for pottery are divided into three great classes, each requiring a treatment peculiar to itself; therefore great care must be taken to prevent the possibility of the colours of one class being mixed with or used instead of those of another, as failure would result from such a course. Great judgment in the selection of the colours of either class, carefulness in their manipulation, and knowledge of the relative proportions wherein they should be brought together, are essential to success. There are some colours—even of the same class—which, if mixed together,

would destroy each other; and on the exposure of some metallic oxides to heat, changes ensue which result from the nature and habit of the colours themselves, as well as from the influence of the bodies to which they are applied.

It would be scarcely possible, in a treatise like this, to explain satisfactorily the inciting causes of all the variations, neither is it desirable to hamper the student with scientific explanations. We shall therefore proceed briefly to describe the peculiar properties of each colour, and its range of usefulness, giving instructions at once for such as require special treatment.

Colours for overglaze painting are subject to some variations in the firing, but are the easiest to manipulate, and require less fire. They are therefore the most useful for the learner, who desires to see the result of his labours as soon as possible. They are generally known as "Enamel Colours."

Enamel Colours, if properly prepared by the manufacturer, will all fuse together at the same temperature, and will all appear equally bright and glossy at the one heat for which they are adapted. This heat is known by the term "Rose-colour Heat." Rose-colour is a very delicate test of firing, and alters in tint from a dull brown when under-fired, up to a beautiful rosy-lake when just the right heat has been reached, assuming a purple or blue hue when that temperature has been exceeded. This fact is well known by the ceramic chemist, who accordingly adjusts the whole of his fluxes for his enamel colours so that they may become bright and pure at the heat required for rose-

colour. It is also well known by the firemen, who always endeavour to give their enamel kilns the heat requisite to bring the rose-colour in them to perfection. Therefore when, during the perusal of these pages, the reader finds reference to "rose-colour heat," he will always understand by that expression the proper heat to which all enamel colours should be subjected in order to fix and bring out their tone. *It is the heat of the enamel kiln.* In order to prevent mistake, it may be well to state that the following colours, if well made, will adhere and become bright at this heat, whether painted upon china or earthenware.

Mr. Sparkes, in his Handbook, upon this subject says, in conclusion, that his

> "... remarks on underglaze and enamel painting apply, as to the processes and the colours named, to earthenware principally—for the china body is not only in itself harder than earthenware, but has a harder glaze, with which many enamel colours have so little in common as to almost fail to adhere, and certainly frequently are found far from rich and glossy."

Mr. Sparkes may be right if by the "colours named" he simply means French colours upon English china, but if he desires to include "Worcester colours"—which he has also named in his book—he is certainly mistaken, for *they are made for china*, to which *all* enamel colours, if well made, should adhere, and appear far more bright and pure than they would if painted upon earthenware. The skill of the ceramic chemist is shown in adjusting his colours to the fluxes, so that they shall appear pure on the earthenware body.

In order that the colours may be readily referred to, they will be taken alphabetically, commencing with

Black (Soft),—a very intense brilliant colour, when not over-fired; but is better used as a self colour, some of the other colours being apt to deteriorate it and diminish its power. For tracing, where other colours are not to come over it, and with a fire not greater than rose-colour heat, it is serviceable; but the colour best adapted for general use or for mixing with the others is

Black (Grey-Black), which is a *mixing* black, and well adapted for greys and light shadows in general. It may perhaps be well to state here that some colours do not shade themselves, therefore artists make such mixtures as best suit their purpose at the time. In most of these mixtures grey-black has a prominent place. Grey-black, blue-green, or soft turquoise and orange in various proportions, will produce a good silvery grey or white shadow. This shade must be worked very thin, with light delicate touches, or it will look dirty. It can easily be deepened, but when once put on too strong it cannot be obliterated satisfactorily, even if white enamel is used, which will not produce so good an effect as light touches of shadow with the lights taken out down to the white surface of the wares. This mixture is known as "Pearl Grey."

Black (Deep-Black) is a similar colour, but much deeper. It will mix with the other colours in the same manner as grey-black. All of these blacks are exceedingly useful for painting in the shadows, and

afterwards washing the whole over with such colours as carmine, purple, greens, etc., etc.

Blue (Azure).—This is an exquisitely beautiful blue, varying from the utmost depth, almost of lapis lazuli or ultramarine in shadow, to the highest brilliancy of light. It is almost transparent, and exceedingly pure, and is invaluable for the purpose of landscape (in the light touches of sky it is indispensable), figure or flower painting. It may be shaded as a pure colour, or will enter admirably into combination with carmine, pink, purple, and black; the three former of which will be used with it for such flowers as the violet, pansy, hyacinth, etc., as well as for the damson and similar plums, or the rich tones of the Hamburgh grape, and the latter—black—to produce very deep shades for drapery or backgrounds for flowers. With grey-black it forms a useful shade for clouds. This colour is extremely pretty when washed over pretty thickly with soft turquoise. Subjects painted in it alone, particularly on an ivory plaque, have a very pleasing effect.

Blue (Deep Azure).—This is a similar colour, but much deeper in tone: the remarks upon the previous colour apply also to this, where a deeper shade is required. It is a rich deep colour for bands round edges of plaques, etc., and for tracing patterns.

Blue (Old Tile).—This colour was made some few years ago, to imitate at a rose-colour heat the blue (underglaze) so often found on old Dutch tiles. It is a soft colour, and is extremely useful in landscapes for sky and cloud. It may be mixed with either of

the azure blues when strength is required, and in neutrals it is indispensable.

Bronzes are various metals peculiarly prepared for china decoration. They vary from the cold grey lustre of steel to the beauty and richness of gold itself; combining also the tints of light and dark greens and rich warm and black browns. They may be worked over or with each other. [*See* MANIPULATIONS.]

Brown (Austrian and German).—These colours are somewhat alike, the latter being of the greater depth and intensity. They are similar to the "bitumen" and "Vandyke" of oil colours, or the "sepia" of water colours—perhaps a little warmer in tone than sepia. Scarcely enough can be said of the range of usefulness of these browns for finishing. Trunks and branches of trees in shadow, and masses of rock in water, may be painted with them, in combination with grey-black. Indeed, in any great depth of shade these colours are required; but they must be made to partake of the colours which it is intended to shade, in order to prevent the harshness of a too violent contrast.

Brown (Golden), as its name implies, resembles gold, and particularly when borders are traced or printed in it with a gold edge or border line placed close to them, when the colour cannot readily be distinguished from the gold itself at a little distance from the eye. It mixes well with orange, yellow, carmine, etc.: such mixtures will be found useful to the painter.

Brown (Chocolate) is a colour approaching a purple-lake. It is useful as a self colour, and will mix with purple, black, red, and Brunswick brown, but *not* with yellow or orange. It is a good colour for tracing ornamental work, which may be filled in with other colours.

Brown (Brunswick) is of the same nature, but of a redder tone. It is an effective colour as a shade on red, and looks exceedingly well either to cut up or trace on gold. [*See* GILDING.]

Brown (Olive), or "Hair" or "Queen's" Brown—by any of which names it is known—is exceedingly useful for figure painting, being of the tint of auburn hair. It will mix well with yellow, orange, carmine, purple, or black: indeed, with most of the colours. It derived its name "Queen's brown" from the fact that one of the first services made by Wedgwood for the royal family was decorated with this colour, specially made for that purpose by the writer's great-grandfather.

Brown (Vandyke).—An extremely rich velvety colour, of a tint between a "madder" and "Verona brown" in oil colours; of depth and great brilliancy, and affording, when pale, very delicate tints. This colour cannot be to strongly recommended to the flower or landscape painter—affording, as it does, in combination with carmine or purple, the rich autumnal tints on leaves. It is also used largely for painting birds. It will mix with orange and yellow, as well as with most other colours.

Carmine.—Scarcely enough can be said of the

beauty and general usefulness of this colour, which is of the character of a rose-colour, but has the inestimable advantage of being less subject to variations in fire; because, while it attains its beauty at the fire adapted for rose-colour, its tint, if it should get more fire, will still remain, while the rose-colour would be lost. Carmine possesses another advantage: it is nearly the same tint when worked as it will appear afterwards; while rose-colour has more or less of a slatey hue. With this colour alone, the rose in all its freshness and unsurpassed beauty can be painted, from its most delicate suggestion of pink to its deepest lakey centre. If, however, it is desired to represent a decaying appearance on the edges of a rose, shadow for white [*see* GREY-BLACK] must be used, or sometimes purple with a little azure blue. One of the most celebrated painters of the old Derby china factory (Billingsley) used scarcely anything but this colour in painting roses. Carmine will mix with browns: perhaps the best are Vandyke and German. These are suitable to use for stems of plants, etc. Most of the other enamel colours will mix with carmine. There is another colour in use called "Strong Carmine" or "Strong Rose-colour," useful for very deep touches in centres of flowers; but it should be used very sparingly indeed, or a hard appearance will result. Nothing added to these carmines can increase their beauty.

Enamel Glazing.—A term employed in order to suggest to amateurs its use, which its proper name, "Flux," might not do.

The following quotation, taken from Mr. Haslem's book "The Old Derby China Factory," will probably explain the use of flux :—

"The bases of colours for both china and metal enamels are the same; the only difference being that the fluxes are varied to suit the peculiarity of the enamel on the metal plates and the glaze on china. All the colours are metallic oxides; the rose-colours and purples being made from gold, greens from chromium and copper, yellows from lead, antimony and tin, red from iron, blue from cobalt, etc. Combinations of different oxides produce different variety of colours. These oxides are by themselves not fusible; they are therefore mixed with fluxes which melt at a low heat, and which hold the oxides in suspension. Most of the metallic oxides which are not volatile, or which would be dissipated by strong heat, are used in the production of colours for painting on china, glass or metal. The fusing of the fluxes acts as a sort of varnish to the colours, giving them that glossy appearance which has probably led to the erroneous impression that paintings on china are done *under*, not *on* the glaze."

It is necessary with strong colours that, to prevent weakening them, they should contain only just as much flux as will render them bright in their deeper shades; hence it arises that colours such as strong blue, rose-leaf green, and similar ones, in their thin parts or washes sometimes appear dull. Were they fluxed by the maker sufficiently to be bright when very thin, their deep shades would be *too* soft, and consequently weak; and to prevent the necessity of the artist keeping a supply of soft colour for washes, flux is used. It is a very useful article in practised hands, but must be used with great judgment. A little glazing or flux is best added to the colour for the thin wash, though there are cases where it may be washed over the colour after firing, and when the painting is

finished. Of course another fire is required for this purpose.

Gold.—This is the precious metal itself suitably prepared by a peculiar process, in order that it may be ground easily into a paint and adhere at a rose-colour heat. It is used exactly as the colours, and appears black when applied; but after firing has a dull or mat yellow gold colour, capable of great lustre when burnished. [*See* MANIPULATIONS.]

Green (Blue-Green) is a delicate, transparent colour, somewhat of a pale turquoise tint. Its range of usefulness is very extended. It possesses no considerable depth, but is invaluable from the fact of being in its thinnest wash perfectly bright; it is therefore useful to wash over or glaze certain other greens in finishing, not so much for the sake of tone as for gloss. It is also a pleasing tint as a ground colour, and does not alter to any appreciable extent with variations of fire. It is extremely serviceable for backs of leaves and distant leaves and sprays, particularly when mixed with a very little grey-black. Being very transparent, it is indispensable in producing works of the character of Dresden and old Chelsea, which are traced or stippled in various colours, and after firing—sometimes even before—washed over with transparent greens such as blue-green. A large portion of the imitation Dresden and old Chelsea, done at the old Derby china works about the year 1780, was, to the writer's knowledge, done in this way. This green is used largely for filling in the spaces between tracings, in patterns of a Japanese or Chinese style.

Here it may be pointed out that mixtures of blues and yellows should not be made, as in water-colour painting, to produce greens ; as such a course would only give neutrals, not clear greens.

Green (Celadon)—a pale duck-egg green—is a colour of limited usefulness, principally adapted for grounds, for which it proves very suitable, affording a very delicate background for plants and butterflies, or similar subjects. "Hard Celadon" is the same colour, but suitable for gilding upon, after firing in the hard kiln.

Green (Light Sèvres) is a transparent green of a yellowish tone. Its range of usefulness is similar to that of blue-green, particularly for landscapes and leaves of plants.

Green (Rose-leaf), as its name implies, is adapted for the painting of the rose's leaf. That purpose, however, is by no means the only one for which it is useful. With it the depth of tone found in heavy masses of sea-water is produced, and with it alone the "ivy green" may be painted. It enters into combination with azure blue for neutral blue-greens ; with browns for rich brown-green shades ; with carmines and purples for autumnal tints ; and with yellows and orange to produce the most infinite variety of shades. When very thin it is perhaps a little dry, and will in such cases be much improved by glazing it with a slight wash of flux, either with or without a little colour mixed therewith. [*See* ENAMEL GLAZING.] It makes a very deep rich ground colour, particularly with two coats.

Green (Dover and Gordon).—These are simply

other tints of green of the same character as rose-leaf, and the same remarks apply to them as to that colour. It may be noticed that it is best to mix a dark green with a light yellow-green, rather than with yellow itself, to produce yellower shades—as there is less trouble in mixing.

Green (Shading).—A blackish green; suitable, as its name implies, for deep shadows in leaves. It simply affords the artist a colour to hand which saves him the trouble of mixing for himself; it may be used with or over rose-leaf, Sèvres, Gordon and Dover greens.

Lilac and Mauve are very useful for grounds, and also for painting where required. These colours, very thinly laid, were the "Peach-bloom" colours of the old Derby patterns. A lovely pair of old Derby chocolate cups, valued at £100, in the possession of Mr. J. Haslem of Derby, and for several years exhibited on loan at the South Kensington Museum, were done in these identical colours.

Orange (Light) is an invaluable colour for general work; combined with rose-colour, it makes the lovely pure flesh tint of the infant's face. It is bright to its thinnest wash, and may be shaded with dark orange. Warmer tints may be produced with washes of rose, carmine, and Vandyke brown, used either together or separately.

Orange (Dark) is as useful as the former colour, but darker.

Orange (Strong).*—A very powerful orange for special touches.

* Orange rather deepens in the fire.

Orange (Opaque).—A valuable colour for prominent lights, where such a colour is required.

Pink is a similar colour to carmine, but lighter in tint: admirably adapted for grounds.

Paste for Raised Gold is a colour made to raise or model subjects on the wares, to be afterwards covered with gold, silver, platinum, bronzes, etc. It must be used alone, and some practice is required in order to work it to perfection; therefore a few hints upon the manner of mixing are given. The colour being placed upon the palette, a small portion of fat oil must be thoroughly rubbed in with the palette knife; turpentine may be now added, and the whole re-mixed well. It should then be about the consistence of colour prepared for oil painting. The artist should now spread it again over the palette, and well breathe into it with the mouth, during which time it must be re-mixed, in order that the moisture from the breath may be well incorporated with the colour. A little turpentine may be added, if necessary, during the process; the colour will then be like a paste, and pretty stiff. The brush—of a size proportioned to the kind of work in hand—must be dipped into turpentine and worked into the colour,—not full, however. Then, as for impasting, this colour must be used with the point of the brush, the artist should pick up on the point some colour by pushing the brush underneath, and then drop upon the ware the point of colour in the exact spot it is intended to occupy. If it has been misplaced, no "boggling" should be attempted in order to move it: it must be dropped exactly

where it is intended to stand. If too much fat is in it, it will be inclined to run about, and would blister in the kiln. If, however, this is only slight, it may be checked by immediately blowing from the open mouth a full breath on the spot. This should be done in any case. The impasting may be repeated until the modelled spot has reached the form or height desired, when, after drying and firing, it will be found to have remained just as it was applied, and to be of a dead yellow surface. It is now ready for the application of the metal, which is applied to it as upon ordinary white glazed ware. Very beautiful effects are produced by this process, heightened by means of the reflected light produced by the chasing tool. The appearance of the work will be like modelled gold. Raised lines of gold may be done by running the lines in paste for raised gold, first by means of the wheel [*see* IMPLEMENTS AND MATERIALS], and after firing, covering them with gold, as above described. The paste must not be worked quite so thick for this purpose.

Purple (Royal) is an extremely rich deep velvety crimson colour, of great power. It will shade itself; and just as carmine will producee very variation of shade in the rose of that tint, so purple may be used quite alone for such a rose as that known as "Prince Camille de Rohan." Black washed over or under this colour is indispensable for the rich tints found in mediæval draperies. Purple washed over with a pretty thick coat of outremer turquoise yields a fine effect, invaluable in the plumage of tropical birds As with

most rich and powerful colours, it must be used with care and judgment, or too great weight would be given to the subject. It will mix with good results with most of the enamel colours, except perhaps scarlet. It will not, however, enter into good combination with greens, which should be washed over with it where necessary. Browns, oranges and yellows, in combination with purple, afford most useful tints. As a ground colour, used alone, it is a fine deep bluish crimson ; with blacks and browns, particularly Vandyke, German, and olive, it gives a useful back-ground ; with blue it will produce the rich and varied hues of the purple iris and hyacinth.

Purple (Ordinary) is a similar colour, but of less depth and richness. It will mix with other colours as directed for royal purple.

Rose.—Everything which has been said of carmine applies to rose-colour, except that the latter is a little softer than the former, and more subject to variations of temperature in the kiln ; nevertheless it is more frequently used in painting than carmine,—perhaps because a knowledge of its variations in the kiln, used with judgment by the artist, assists his effects. "Rose de Berry" is a hard-kiln colour. It is the colour for which the Sèvres works were so justly celebrated. It is somewhat difficult to manipulate, and rather treacherous in the fire. It is only used for grounds.

Red is one of the most useful colours for the learner, as it will work very easily when well mixed. It is usual for apprentices to china painting to be

kept at a course of red for a considerable time, in order to learn the free use of the pencils, etc.; and when they can easily paint or trace in this colour, without smears or rough appearances, they are gradually initiated into the use of the other colours. When so thinly mixed as to be little more than stained oil, it makes a very good fawn-coloured ground. This colour, shaded by itself, was almost exclusively used at the old Derby china factory for painting flesh on Chelsea figures. The addition of a very little white enamel adapts it the better for this purpose. When greater depth of shade is required than could be produced by the colour itself, Brunswick and chocolate browns and Chinese red may be worked over it. Yellow and orange must not be mixed with it, as they destroy it in the fire. When a pure red is desired, it must be used alone on the pure white china.

Ruby, or Ruby d'Or (by both of which names it is known), is in reality a colour for the hard-kiln, and when it has received that heat is a rich ruby crimson. It is nevertheless useful to the enamel painter for fine light touches in centres of flowers, or a very thin wash, over which a softer and more transparent colour is worked, adding considerably to the depth; mixed with German brown it forms a rich purple brown for finishing edges of leaves and sharpening up orange-coloured seeds; for special purposes a little flux may be added with advantage. This is a splendid colour as a ground *when fired hard-kiln heat.*

Salmon is a near approach to the delicate flesh

colour of the salmon, and makes, as a ground alone, a very delicate tint. It is useful to the figure painter as a flesh colour, particularly as it may be varied by a mixture of orange, Vandyke brown, pink, or carmine.

Scarlet is a fine opaque colour, but it must be used thickly, and alone, *on the ware itself.* It is best to touch with this colour last, having left spaces for that purpose. It represents with good effect the holly berry, and may be shaded with very light touches indeed of purple, black, or Vandyke brown.

Silver.—This metal is prepared in the same manner as gold. It tarnishes somewhat in time, and is therefore not so serviceable as platinum. [*See* MANIPULATIONS.]

Turquoise (Soft).—A similar colour to blue-green; but having more of the turquoise tint, and being more opaque. It produces fine effects used over azure blue. It is a beautiful colour as a ground, but must be *painted* thickly. "Outremer Turquoise" is an exceedingly fine colour, either alone or over purple or black, of the character of "aureoline" in oils. It is very useful in bird painting. Mixed with rose-colour, it gives a beautiful pearly tint for the shadows of roses. It is a rich tint for high lights in finishing. Either of these colours is admirably adapted for a background to figure subjects on tiles: tracing a diaper pattern in blue, deep black or brown, and washing over pretty thickly with turquoise.

Violet.—Useful principally for grounds, and to a less extent for painting, thereby saving mixtures.

White Enamel.—A pearly, semi-opaque paste, somewhat of the character of "flake-white" in oils. It is an exceedingly useful colour in proper hands, as with it points of light may be judiciously added on the top of the finished work where it would have been impossible to leave the white china,—as for instance a point of light in an eye. It answers a necessary purpose, but it must be used with great discrimination. Broad patches of enamel on finished paintings always indicate the work of the novice; a far better and softer effect being produced by taking out the lights in the first painting. Where lights must be put in by means of enamel, and they are not required to be pure white, colour may be added with good effect, the result being a sparkling appearance caused by the impasto. It must be put on pretty thickly and mixed after the manner of paste for raised gold, and dropped just where it is intended to remain.

This, however, is by no means the only use to which white enamel may be put. Fine results are possible by painting—or rather modelling with a pencil—flowers (particularly prominent ones) in *enamel*, on a ground already laid and fired. To do this, the colour must be "plumped" on thickly, the necessary form being preserved by going round the edges with the pencil stick; when, after firing, colours may be painted on the enamel and the leaves and stems painted in. For this purpose the hard enamel should be used; or if the "medium," great care must be exercised in firing gently.

Another application of this colour is for work

known as imitation of Limoges enamel. The subject is for this purpose painted on a deep mazarine blue or other coloured ground, the lights *put on* and softened down to the ground, which, showing through the thin wash, gives the shadows. Very fine examples of this work are in existence. In appearance it resembles *pâte sur pâte.* When well done, it is exceedingly soft and beautiful. A general wash of transparent colour such as light Sèvres or blue-greens, all over the subject, adds to the effect.

White enamel can also be used in decoration for spots resembling pearls. It must be treated for this purpose as paste for raised gold, to which the reader is referred.

Yellow (Light) supplies the place of "gamboge" to the china painter, and perhaps needs no description. It must not be mixed with red, Brunswick or chocolate browns, as it will destroy them. It ranges from a pale primrose to the deepest yellow.

Yellow (Persian) is stronger than the above. "Persian Yellow Hard" requires a hard-kiln fire, and makes an exceedingly rich ground colour. Very slight touches may, however, be done with it on other colours.

Yellow (Opaque) takes the place of opaque orange where that colour is not serviceable.

The following combinations were in use many years ago by a celebrated landscape painter of the old Derby works, named Lucas. They are in the writer's possession, and he deems them sufficiently interesting to publish.

SKY.

Light blue (old tile blue) | Azure blue

SHADOW FOR CLOUDS.

Two blues | Grey black
Purple and rose-colour

SHADOW FOR LANDSCAPE AND FOR FINISHING THE DISTANT SHADOW.

The two blues — Yellow
Black — Rose colour
Olive brown.

FOR FINISHING MIDDLE GROUND.

Grey black — Orange
Purple — Olive brown

FINISHING FOR FOREGROUND.

Grey black — Purple
Chocolate — Rose
Olive brown.

Glazing the whole with orange, yellow, and transparent greens as required.

All colours should be fired as soon as possible after painting. In order that the reader may realize the importance of this, we beg his attention to the following quotation from "The Old Derby China Factory." Speaking of one of the painters who lacked patience, Mr. Haslem says,—

"Sometimes he got tired of these large pieces before they were finished, and let them stand in an unfinished state for some time; the consequence of which was, that those flowers which had not been fired would when fired be less bright than the other parts, the atmosphere having acted injuriously on the colours from long exposure to it in their unfused state. The sooner a piece of work is passed through the kiln after it is painted, the brighter and purer the colours will be. Rose-colours and purples suffer particularly from long exposure before burning."

Processes and Manipulations.

HAVE all the things likely to be needed within easy reach of the right hand; this prevents unnecessary and unpleasant soiling of the dress. Have beside you a supply of linen rags to wipe palette knives, etc.

Mixing the Colours.—The quantity of colour thought likely to be required may now be placed upon the grinding slab. The fresher the colour is worked, the purer and brighter it will look when fired. A small portion of fat oil must be well rubbed into it with the palette knife, until the oil is lost in the colour; then add turpentine, and grind

finely with the muller, adding turpentine as the colour seems to become dry under the muller. When quite fine—this is but the work of a minute, the colour having been previously reduced to an impalpable powder by heavy steam machinery—the muller should be cleaned by scraping it with the palette knife, and the whole carefully mixed, adding a little rectified spirits of tar, which serves to keep the colour open. A very little more fat oil may now be added, if necessary; and by thinning the colour occasionally, as it may be needed, with turpentine and a little tar, it can be kept in a good painting state. Should it flow or spread about on the palette, by simply breathing into it and at the same time mixing it with the knife, adding tar if necessary, it will be found to work solidly and freely, so that lights can be taken out right down to the surface of the china.

Never use more fat oil than is absolutely necessary to work the colour well; or it will be liable to "blib" or blister in the firing.

Colour may be more easily re-mixed for use after it has hardened upon the palette, if tar has been freely used.

The more quickly a painting is done—*i.e.*, the less "boggling" there is with the colours when working them—the brighter and cleaner they will appear when fired.

The author would recommend the novice to make for himself a

Test Plaque, after having carefully studied the

list and descriptions of the colours already given, bearing in mind those which work and fuse well together. Let him make different mixtures from the suggestions given, and keep a memorandum of such mixtures: he may number them by scratching upon the colour, when painted upon his plaque, with a pen or pencil stick, his memorandum of course bearing corresponding numbers. Perhaps the most ready means of doing this is separately to mix [*see* DIRECTIONS FOR MIXING] the colours he requires to use in the compound. Let them all be as nearly as possible of the same consistence. Let them be placed on a clean slab or palette in little heaps before him; then with the point of his clean knife let him pick up one portion of one and two portions of another, and so on; transferring each as he takes it up to another palette, and making at once a memorandum of what he has done. Then let him well rub them together with the muller, and either with his finger or a brush paint a sample on his plaque, taking care that it is as strong as possible, and graduated down to the faintest shade. Let the number be immediately scratched on it, and then, if necessary, other proportions of the same colours mixed, and so on to the end. Let the whole be done on one plaque; then it will be seen how they all fire together, which is tested by putting in the centre of the plaque a little pure rose-colour. If, as has been explained, after firing, the rose-colour is yellow or brownish in tone, the plaque is under-fired; if bluish, over-fired; while if sulphur has been

present in the kiln the whole of the colours will appear somewhat dry and have a scum upon their surface.

It will not be necessary for the student to make a test plaque of the *pure* colours, as that can be obtained *properly fired*, and will serve as a test as to whether his own plaque has received proper

treatment in the kiln. When sending such a plaque to the kiln, the direction given should be, "Give it a nice rose-colour fire,"—that term being perfectly understood by all firemen throughout the trade.

All colours must obviously be kept free from dust and separate from each other.

Some colours, such as white enamel (which is best

mixed with a bone knife, as the iron affects it, sometimes staining it yellow), rose-colour, and red, are better used on separate palettes; and special pencils should be kept for them, thus avoiding dirtying them. Of course this only applies when the colour is desired pure.

Though, as has been stated, it is always better to use newly-mixed colour, this is not always practicable, and at the end of the painting for the day some colour may be left; in such a case it will not deteriorate appreciably if a clean saucer is inverted over the palette, and it may be re-mixed the following day for use. If, as will be the case in hot weather, the colour the next day be found to work fat, a little new colour may be added to it. This is the great difficulty with tube colours, as the colour in the tube fattens by keeping, and the artist has no means of restoring it, such as above indicated.

In order to economize space, several different colours may by a little arrangement be kept on one palette; care being taken that they are not such as will injure each other.

Backgrounds and How to Lay them.—The subject having been sketched in pretty strongly with Indian ink, sufficient colour of the desired tint must be prepared in order to cover the whole of the ground. This may be either a pure colour, or a mixture of several, according to the feeling of the artist himself. The addition of a little oil of aniseed will prevent it setting so soon as it would if mixed only with turpentine or fat oil. Using a large camel-hair brush,

the colour should now be rapidly washed over with light sweeps, as nearly as possible of the desired thickness; when it is getting a little set, it should be lightly brushed over cross-ways with a large flat camel-hair tool, to level it; this must not be done too soon, or the colour would be brushed up. The piece may now be laid aside to dry a little, when the sketch will be seen through the colour, which must now be scraped away with a penknife or eraser, and the painting proceeded with on the white surface so exposed. After firing the ground may be similarly strengthened if desired.

Groundlaying.—We will here quote again from Mr. Haslem's useful book:—

"The early method of laying grounds or covering large surfaces with one colour was to paint them with a flat brush; and it was difficult to put some of the colours on a smooth surface so as not to show the brush-marks. Yellow, peach-bloom, fawn, and pale red, were less difficult to work than most others, as they could be laid evenly, being worked so thin as to be little more than stained oil; this may account for them occurring so frequently among the old grounded patterns. The present mode of laying grounds, by dusting finely ground dry colours on an oiled surface, was for many years kept a profound secret, the men working at it being usually locked in a room by themselves. John Hancock * was one of the first to practise this new method. He was also a clever painter, particularly of birds, and his imitation of the latterin the Old Sèvres style was perfect."

Groundlaying, as at present accomplished, is a somewhat difficult operation; but the amateur will be amply repaid, whatever trouble he may bestow upon learning it, by the facility with which he can after-

* The writer's grandfather.

wards lay his grounds perfectly level ; therefore the reader's attention is begged to what may perhaps appear an unnecessarily prolix statement.

The article to receive the level ground must be coated with "grounding oil" by means of a large flat camel-hair brush, not less than one inch wide.

According to the thickness of the coat of colour desired, the coat of oil must be a thick or thin one. The piece must then stand aside a little, and when the oil has become somewhat set, so as to be "tacky" to the finger, it is ready for the second process, called "bossing." The boss consists of a lump of cotton wool screwed up, as it were, in two or three thicknesses of fine soft linen ; taking care that there are no creases on the surface. A thickness of fine silk or very soft leather, free from lint or crease and fastened at the back, completes it. Enough linen should be left screwed up at the back to enable the operator to hold it easily. The article should now be taken in the left hand, and holding the boss in the right by its back roll of linen, it should be dabbed firmly but gently upon the whole of the oiled surface ; this removes all uneven ridges of oil left by the brush. The oil should be just dry or set enough to allow this to be performed without leaving a single mark of the boss upon it. The piece is now ready for the third process, which is simply to dust the colour desired in an impalpable powder over the oiled surface by means of very fine cotton wool. This must be done with a very light hand, and must be repeated until the oil will not absorb more colour on any part of its surface.

Superfluous colour can be dusted off with a dry flat camel-hair brush.

Sometimes it may be desired to give a ground colour of, say one, two or three inches wide, round a plate or plaque, leaving the centre of the piece clear white. In this case the wheel [*see* IMPLEMENTS] will be needed. The plate having been centred on the wheel, the requisite breadth of band may be oiled on perfectly true, keeping the arm steadily upon the arm-rest. It is of course then dusted as before directed.

If a subject is desired to be painted with the ground as above described all around it, the necessary process is known as "*stopping out.*" This is done by means of a preparation called "stencil," which is merely common (not ceramic) rose pink, mixed up on a palette with golden syrup and water, and ground finely; no more syrup being used than is sufficient to make the mixture work freely from a camel-hair pencil. The process is very simple, and may be briefly described as follows:—

Sketch in, on the white surface of the china, the group, or panel, or number of panels desired to be left white for future painting when the ground is done; then paint over with "stencil" the surface between the sketch lines, taking care that the lines themselves are also covered with the "stencil." This need not be done thickly—only just enough completely and thoroughly to cover the white china. Dry the stencil, and carefully clean the surface with linen to remove all finger-marks; then proceed to oil over the *whole*

surface, covering the stencilled part as well as the rest, and dusting on the colour as before described. The piece must now stand for, say an hour; then immerse it in a vessel of clean water, moving it gently about, when, in a few seconds, the stencilled part of the ground may be removed, and the white china left,

by very gently rubbing it with fine loose cotton wool *while it is under water.* When all the stencil is removed, take the piece out of the water, and dry it thoroughly before a fire. Carefully remove all water-marks and stains from the white part, and send it to be fired; when the painting may be proceeded with in the ordinary manner.

Beautiful effects may be produced by combinations of these processes—particularly for tiles. For instance: trace a diaper pattern in azure blue, German brown, purple, or ruby; fire the piece, then groundlay the whole of the surface with a transparent colour. The tracery is now seen beautifully subdued through the transparent colour. Such colours as blue-green, turquoise, etc., should be pencilled on, because by the process of groundlaying they would not be thick enough to give the necessary soft effect.

The following colours are the most suitable for groundlaying for backgrounds. **Azure blue** gives a pale violet shade of blue when used by this process and laid thin; this tint is improved by washing or stippling over it for shadows after firing. **German** or **Vandyke brown**, or **Purple** with **Vandyke brown**, and **Golden, Olive** or **Vandyke browns**, also are serviceable, shaded with darker colours.

Perhaps the most beautiful colour for laying grounds for borders is **soft turquoise.** This, however, *must* be laid with a pencil and painted thickly. **Ruby d'or** and **Rose de Berry** are splendid colours, and suitable for this purpose, but require the practised hand of the regular workman, and *must* be submitted to a hard-kiln fire.

Subjoined is a list of colours most easily groundlaid (or oiled and dusted) for a rose-colour heat:—

Purple: a deep bluish crimson; one or two coats.

Carmin: one or two coats.

Pink: a pale, delicate carmine.

Lilac and Mauve: one or two coats.

Sèvres (Light): one or two coats; a light pea-green.

Sèvres: one or two coats; a dark pea-green.

Rose-leaf: one or two coats; a splendid dark green.

Celadon: a very delicate duck-egg green; must be thin.

Orange (Light and Dark): one or two coats.

Yellow (Light and Dark): one or two coats.

Red: a very thin coat, appears a fawn-colour.

Scarlet: makes a splendid ground at one thick or two thin coats, but is difficult to work and to fire.

Outremer Turquoise: one or two coats.

Sometimes a thin coat of another colour is laid over one already fired; and beautiful tints, otherwise difficult to secure, may thus be obtained. If however, a mixture of colours is desired to be grounded, let the mixture be ground in *water* perfectly fine, left to dry, and then brushed up together with a hare's foot, ready for use. Never attempt to use a mixture without this previous preparation, or the oil will find out the particles of unmixed colour, and give a spotted result anything but pleasant.

Gilding.—Many handbooks, in treating of this department of pottery decoration, give voluminous directions which are now totally unnecessary, the processes having been superseded long ago.

Dr. Lardner, writing in 1832, says:—

"Gilding on porcelain is performed with or without fluxing material, the gold adhering either by the incipient fusion of the porcelain glaze, or the flux employed. When used without flux the ware must be moistened with gum water or japanners' gold size, leaf gold laid on with cotton wool, and the ware put in the

muffle that it may be burnt. If flux is employed it should be rubbed fine, diluted with gum water spread on the parts designed to ornament, and when nearly dry, leaf gold laid on it."

Dr. Shaw, in his history of the Staffordshire Potteries (1829), says :—

"Hancock* was engaged at Messrs. Turner's *prior to 1800, where he introduced the present method of gilding, in place of leaf gold used upon size.*"

In the catalogue of the Museum of Practical Geology, published in 1855, is the following :—

"The method of gilding by means resembling water gilding instead of employing leaf gold, was subsequently, and prior to 1800, introduced by John Hancock."

It may be interesting to know that John Hancock was one of the first to introduce and practise the art of making colours in this country; and so greatly was he respected by the old workmen, who always went to him in matters of difficulty, and to whom he freely gave valuable information, that he was constantly spoken of as "The Father of the Potteries." Many of the recipes worked from by the pottery colour-makers in the present day are his, and the general flux of the pottery district known as "No. 8 Flux," is the No. 8 of his private book. He also discovered and first put in practice the gold, silver, and steel lustres.

A recent authority has stated that lustres were invented by Mr. De Morgan of Chelsea! The writer has in his possession not only the original formulæ

* This was the writer's great-grandfather.

for the process, but also the following letter, published in the *Staffordshire Mercury* in 1846, one year before the death of his great-grandfather, in justice to whose memory he begs the reader's perusal :—

"SIR,—In the notice of the death of Mr. John Booth, of Well Street, inserted in your last week's paper, it is stated that he was the inventor of lustre for earthenware. I beg to state that this is incorrect, as I was the original inventor of lustre, which is recorded in several works on Pottery ; and I first put it in practice at Mr. Spodes' manufactory for Messrs. Daniels and Brown, and continued to make it long before Mr. Booth or any other person attempted to do so. If Mr. Booth's friends should doubt the truth of this statement, I shall be very happy to furnish them with proofs on the subject, or answer any questions which they may think proper to ask.

"Perhaps Mr. Booth's friends are not aware that I am still alive, although at the advanced age of eighty-nine. By inserting this you will oblige one whose character is at stake,

"JOHN HANCOCK.

"*Etruria.*"

Returning to the subject of gilding, the writer has bestowed considerable personal attention upon it, and carefully adapted fluxes to gold specially prepared, so that the manipulation is now simple, and needs only a brief description.

Prepared gold is in the form of a slate-coloured powder, unground. A quantity is usually ground and mixed with its necessary fat oil, as if kept covered up it does not deteriorate, as would be the case with colours. It will get a little fatter, but that will not be of any material consequence.

Gold must be ground in turpentine with a clean glass muller, and on a clean glass slab, *perfectly fine ;*

indeed, it cannot be ground too much. Turpentine must be added, to replace that which evaporates during the process. Some little time will be required to do this properly. When finished, allow the turpentine to evaporate somewhat, and add rather more fat oil than is required for colours: just enough to allow the gold to work solidly yet freely, as too much will cause it to boil or blister in the kiln. It may now be scraped up carefully, keeping in view the precious nature of the material, and put aside into some small pot or wide-mouthed bottle, which can be well corked, using from it as required. The slab above mentioned should be kept for this work alone, and the muller also, to prevent wasting the gold. It is now in the form of a brownish-black colour, and should be about the consistence of well prepared oil colours. A special palette and brushes are required for gold, still to prevent waste from cleaning. The brushes or pencils generally known as "tracers" and "liners" are used, and occasionally, where large surfaces of paste for raised gold are to be covered, "shaders." The very best—*i.e.*, those with the most "spring"—should be selected.

Pencils used in gold are usually kept unwashed. After the work is done, the gold should be worked out of them upon the palette and well scraped together, and an inverted saucer placed over it to keep it clean. The hairs of the brushes may then be put straight, and the brushes slightly dipped in fat oil thinned with a little turpentine; this will keep them soft for any reasonable time. If, however, they do become hard. they need not be discarded, but may be softened by

dipping them frequently in turpentine, and holding them before the fire, when a little patience will soon recover their elasticity. On no account hurry them by attempting to open the hairs, or by bending them on the palette, as that would break them. All these precautions are necessary, not for the value of the brushes themselves, but on account of the gold contained in them. The writer has known gilders keep a good gold pencil which has become a favourite for many years by these means.

In applying the gold to the china, it must be borne in mind that the object is to cover the wares with a thin but even coating. Putting on a thick coat will not add in the least to its richness, as it is opaque, and the surface only seen. It must not, however, be a wash, but a solid even coat, no ridges being left by the pencil. As the turpentine evaporates quickly from the gold in working, a little should be added frequently, and the gold remixed; the pencil also requires frequent dipping in turpentine, to keep the hairs all free and open. Gold, and everything connected therewith, must be kept scrupulously clean, and colour on no account mixed with it. It is best to keep a special turpentine pot for gold alone, as some colour will settle at the bottom of the turpentine used for colours, into which, if used, the tip of the gold pencil would probably be dipped, and some of it would be transferred to the palette, spoiling the gold at once.

Gold is prepared to fire at the rose-colour—or, as it is sometimes called, gold heat. After firing it appears a mat yellow gold colour, and requires burnishing to

give it brilliancy. If under-fired, it will rub up under the burnishing tool; if over-fired it will be sunk to some extent into the surface of the china, and will not burnish at all. This preparation of gold cannot be used on colours, unless on such as are prepared for, and fired in the "hard kiln." Another preparation, however, called unfluxed gold, is made to fire on thin grounds of colour fired in the enamel kiln; but the novice is recommended to confine himself to that generally known and understood by the firemen.

Although gold cannot be worked upon colour, colour may be worked on gold; and very beautiful effects will result by laying a ground of gold, and tracing red or Brunswick brown diapers, or figure or other subjects upon it.

In concluding this subject, the reader may be told that, just as learners at manufactories are not allowed to use other colours until they can work red well, so they are never allowed to use gold until they can work colours well; therefore, to prevent unnecessary waste, he is recommended to adopt the same course.

Burnishing.—As previously stated, when gold comes from the kiln it appears only as a mat or dry yellow colour, and requires the burnishing tool to make it assume the brilliant appearance generally connected with the metal. The burnishing tool is a well selected and polished blood-stone, fixed in a socket of iron and having a short wooden handle. Cheap blood-stones are, as a rule, worthless; being such as have been discarded by professionals and offered afterwards at lower rates. None but the best should be used, or the gold

will be scratched. This tool will require cleaning frequently to keep its smooth surface; which may be done by rubbing it upon a thick piece of leather, on which a little "burnishers' putty" is kept. This leather should be about eight inches long by two wide, and say a quarter of an inch thick—glued to a piece

of wood a little wider. It should lie at the right side of the operator, so that he can occasionally rub the tool upon it. A little whiting mixed into a paste with water and kept within easy reach in an egg-cup, and a large clean linen cloth, will complete his stock of materials.

Extreme cleanliness is required in this operation.

The person burnishing should always interpose the linen between his fingers and the porcelain. The blood-stone should be applied lightly, but firmly, on the gilding, following all the ornaments, and never rubbing in cross directions, or the work will look scratched. The piece should be held in the left hand and pressed against the table to keep it firm. After going completely over the gold once, a little of the whiting above described should be rubbed on it with a soft linen cloth. This removes the greasiness, which in spite of every care will arise. The whiting removed, and the burnishing process repeated, a brilliant polish will be given. Sometimes the tool appears not to do its work well. If so, rub it firmly up and down the leather on which the putty powder is placed, wipe it, and proceed again.

If the gold has been over-fired, and does not appear to burnish, it must be re-gilt.*

Chasing.—If a little gold, just as it comes from the kiln, is drawn upon with the point of the blood-stone, a keen polished line will result. It is natural that such an appearance gave the idea of sketching or engraving with a blood-stone or agate point upon a mat gold ground. This manipulation is termed "chasing"; and very beautiful effects may be produced thereby, equal to the finest etchings. A chasing tool is simply a pointed blood-stone or agate of a superior kind. The work will require cleansing, as it proceeds,

* The burnishing should be the last operation of all, as, if the wares require to go into the kiln again, they will require burnishing each time, the polish being destroyed by the fire.

by means of whiting. Chasing must be done with a very practised and steady hand; and the arm and finger rest [*see* IMPLEMENTS], will be needed, as a stroke once made cannot be effaced, except by re-burning.

Bronzing.—As the old Potters found models in the bronze vases, it was very natural they should desire to imitate not only the forms, but also the metallic lustres. Hence we find the feet and plinths of old Sèvres, Derby and Worcester vases covered with a "brown lustrous bronze." These bronzes were afterwards introduced into patterns; and now that the Japanese style, with its diversified bronzes and lacs, is so deservedly cultivated, they are in great request to cover modelled representations, lizards, etc., on vases; as well as for the lower reliefs, which may be produced by means of the paste for raised gold, the manipulation of which has already been described. Bronze requires grinding, and otherwise treating exactly as gold, and is so prepared as to fasten to the wares at a rose-colour heat. After firing, it appears a mere dry powdery-looking colour, and requires the process known as "scouring" to produce its metallic lustre. Scouring is done as follows:—A little exceedingly fine silver sand, which has been sifted through a silk lawn, is placed in a saucer or other vessel at the operator's right hand. Then let him take a piece of soft linen cloth, into which he should put his finger; moistening the cloth, in order that, when dipped, or rather touched on the sand, it may pick up a little. Then, holding the piece to be scoured in the left hand, let it be gently rubbed with a circular motion with the sanded cloth; when,

if the bronze be properly fired, its metallic lustre will appear. Some of the powder will rub away in the process. If, however, the bronze has received its proper heat, no metal is wasted, but merely the colouring matter with which it was mixed ; but if, on the other hand, too little fire has been given, the bronze will also be rubbed off, and the surface of the ware shown. It is best, therefore, to try one spot first, and if it is not fast re-fire the piece. Very beautiful effects are possible by first painting a dark bronze as a ground, and when fired and scoured a lighter one worked on the top of it, according to the pattern designed. The same thing, of course, may be done on the surface previously prepared with paste for raised gold.

Bronzes require to be painted on much more thickly than gold.

Silvering.—Prepared silver must be ground extremely fine, and mixed and kept in the same way as gold. Perfectly clean pencils must be kept for it. The metal requires to be painted on much more thickly than gold, as it is not so dense. It is prepared to fire at rose-colour heat, and may be either burnished or chased. It is liable to tarnish in time when painted and burnished, therefore is not in some respects so good as

Platinum,—which is prepared in a similar manner, and requires similar treatment; but it does not tarnish, neither is its polish removed by repeated burnings, when once it has been burnished or chased. It has not the purity of tone of silver, having more of the metallic lustre of polished steel. Advantage may be

taken of its peculiarity in retaining its polish by painting designs in platinum on a ground already painted in gold. After firing, the *whole* must be burnished, then re-fired; when the ground of gold will appear dull, while the platinum will still be bright. The spaces intervening between the design can also be chased in fine lines, or perhaps diaper patterns, with beautiful results.

Underglaze Colours.

UNDERGLAZE colours are specially prepared for painting on the dry (biscuit) surface of the wares before the glaze on which they depend to bring out their rich depths is applied. The fire required for them is far greater than rose-colour, or enamel kiln heat. It is known as "glost oven" or "glaze kiln" heat. The term "biscuit" applies to every description of pottery in its unglazed state, from the porous terra-cottas and Lambeth stone-ware to the finest creamy white porcelain. It is dry and dull in surface, more or less absorbent, according

to its composition and its firing, and possesses the peculiarity known by artists as "tooth"; hence it is adapted for painting large and bold subjects. Indeed, we may distinguish enamel from underglaze painting much as we should water from oil colour painting. In other words, just as lights are *left* in water colour *painting, using only Chinese white where absolutely necessary, so they are in enamel painting; while as* shadows are painted in and lights *put on* with more or less of flake-white mixed with the colour in oil painting, so should they be with underglaze work. It is the oil painting of the ceramic artist. Unless he takes full advantage of the underglaze process to produce the peculiar effects of oil painting, he may as well confine himself to enamel painting, which is infinitely less troublesome and expensive, and which makes much smaller demands upon the skill of the artist. To resort to underglaze colours to produce only what could as well be done in enamel colours, recalls Charles Lamb's story of the Chinaman who burned down his house to roast his pig.

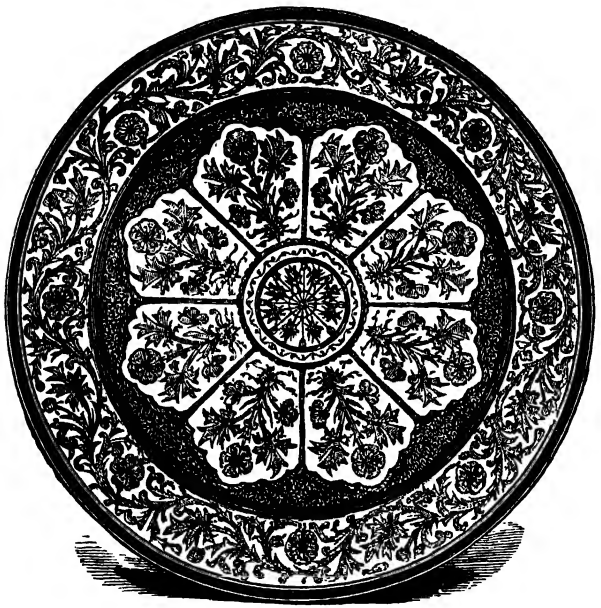
The vehicles required are the same as for enamel colours. Far better effects may be produced with colours mixed with turpentine and fat oil than, as has been recommended, if gum water or water and golden syrup are used. Here, however, there is not the same risk by using fat oil, as the colours undergo a process known as "hardening on" before glazing, which burns all the oil out; therefore if the artist desires broad flat washes of colour, fat oil may be freely added, while if he is painting-in high lights, and desires to give his

picture the crispness of an oil painting, the colour must be worked more "raw"—*i.e.*, with less fat oil. In practice sometimes, if great depth of tint in a painting is desired, part of it is done in gum water; when, after drying, colours may be used upon it mixed in turpentine and fat oil. If the smooth appearance of enamel painting is contemplated, camel-hair pencils must be used; while, if the artist desires to give the rough surface of an oil painting, fine hog tools are necessary, using camel or sable hair brushes for finishing touches.

The sketching may be done either with a lead pencil or crayon; and care should be taken to prevent the outline being destroyed, as it is somewhat difficult, owing to the roughness of the surface, to take out colour and leave it clean. The drawing should be done with great care; the handling firm, free, and bold; the lights impasted with a full pencil and stiff colour, producing *actual* relief. This is particularly necessary in foregrounds, and gives a sparkling effect to the picture. In painting underglaze work, particularly on large surfaces, it is always desirable to place the subject before the eye, and in such a position that the light may fall from the left hand upon it.

As a rule, the whole of the desired painting should be done before the piece is sent to be fired. The glazing and firing should be looked upon as the varnishing process, but this is by no means compulsory. If very elaborate work is in hand, it may be dried, and then a very thin coating of glaze *pencilled* over it and fired. This will to some extent determine the depth of

colour employed, and give a little gloss, and fasten the work, when it may be repainted. If this is done, care must be taken not to paint or impast too thickly the first time. The second painting done, the whole may be glazed and fired. Even after this, and when all the colours are seen, as it were, under a coating



of varnish (glaze), the painting need not end ; for the artist has it in his power to paint in the detail with enamel colour.

This power, however, must be used judiciously, in order not to destroy the depth and brilliancy of the original work, and so reduce the picture to the appearance of an enamel painting. Another point which

must not be forgotten is, that the enamel finishing must have a separate fire afterwards in the enamel kiln. A little glazing kept upon the enamel colour palette, into which the artist should occasionally dip his pencil (after the mode of using magilp), will materially assist the softening down of the enamel colours into the underglaze work, and will add considerably to the innocent deception. The first painting in underglaze colour insures boldness, freedom, and depth, to which the enamel painting adds the delicate finish peculiar to that process.

The writer's idea of a complete ceramic picture is not simply so much underglaze or overglaze painting; but a combination of these, or any other processes which may be discovered, by which the artist is enabled to represent in material forms the ideas of nature which are in his own mind as they are presented to him. Indeed, herein lies the great advantage of the artist-workman or amateur over the mere operative, who earns his daily bread by painting plants at fourpence apiece. The *artist* is anxious judiciously to step out of the beaten track, and avail himself of any means by which he can produce more beautiful work than he has hitherto done.

The method of mixing underglaze colours is precisely the same as in enamel colours; but special care should be taken thoroughly to grind them with the muller, otherwise a gritty appearance will result, consequent upon the specks of colour appearing through the glaze. Underglaze colours, it cannot be too often repeated, must not be used with, over or under enamel

colours, except in accordance with the directions above given, or both will be destroyed.

The following list of underglaze colours, with combinations, will form a sufficient stock for every purpose :—

Black.—A very positive and powerful colour ; best used alone.

Blue (Azure).—A rich somewhat delicate blue, very useful for skies ; will 'mix well with white, or work on or over it. As, however, there is some little difficulty in assuring oneself that a glaze will be put upon the painted wares which will suit this colour, it is always better to use it sparingly, thin washes not being affected so much by an unsuitable glaze.

Blue (Ultramarine).—An exceedingly rich colour, similar in character to the above ; and the same remarks as to glaze apply also to it—not, however, quite to the same extent. It may be mixed with white also, or the other colours.

Blue (Mazarine).—A most splendid colour of a deep purple-blue hue. The writer having bestowed great attention upon its manufacture, it is not now so difficult to work as formerly it was. It is the *bleu de roi* of the Sèvres, Chelsea, Derby and Worcester works. It will mix with the other blues and white, and indeed with most of the underglaze colours.

Brown (Vandyke),—similar to Vandyke in enamel colour. Paint somewhat strongly. **Chesnut,** a similar colour, but rather stronger and redder. **Deep,** a blackish brown. Very rich tints may be made with these in combination, or worked one over the other.

With a dash of black over them, a splendid sepia tint results. These colours are admirably adapted for backgrounds.

Buff.—A very useful colour; requires painting strongly.

Crimson.—This colour is the same tint as the strong carmine of enamels, and a most powerful and valuable addition to the underglaze palette.

Dove.—A colour very useful for grounds, and delicate tracing also, but perhaps somewhat fickle.

Fawn.—An invaluable colour for painting, resembling the delicate tint of the animal.

Green (Rose leaf, No. 1 and No. 2).—Good strong dark greens, very useful for foliage; the latter being somewhat bluer than the former, **Sèvres** is a delicate light green, very useful in landscapes, representing the fresh green of spring, particularly where light renders the young leaves transparent. **Pea** is somewhat similar, but lighter in tint. **Apple** is a brownish or olive-tinted green.

Mauve.—Similar to the mauve of the enamel palette; rather fickle, and depending upon the glaze. Paint strongly.

Orange and Yellow.—May be placed together, and sufficiently describe themselves. Crimson washed over them is improved thereby.

Purple.—A powerful blue-purple; very valuable, and, as it is now made, a reliable colour.

White.—Similar in appearance when glazed to white enamel in enamel colours, but it should be borne in mind that it is to the underglaze artist

what the *Flake White* is to the oil palette, and may be mixed freely with all the colours except black. It may be impasted strongly for high lights. The colours mixed with it, and put on crisply with hog tools, have all the appearance of an oil painting. The writer has now just had finished an underglaze painting in this style, which cannot be distinguished from a landscape in oils, and which will remain for thousands of years as fresh and perfect as it is at this moment.

ica Ya

FABIO FERRARI tells us that "the use of majolica, as well as its name, came from Majorca, which the ancient Tuscan writers called "Maiolica"; and Scaliger, writing in the sixteenth century, speaking of the wares of this description, says,—

"We call them 'majolica,' changing one letter in the name of the island where we are assured that the most beautiful are made."

This term was originally applied only to wares ornamented with lustres, but since the decline of that

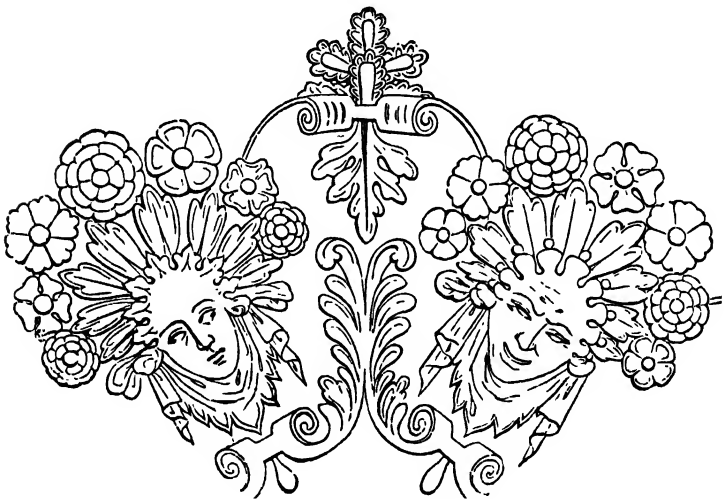
manufacture it has been somewhat loosely applied to Italian enamelled pottery of all kinds. The term, strictly speaking, applies only to such descriptions of lustred ware as would resemble those of the island whence they were originally imported into Italy.

The term, as given to this manufacture in England, simply means wares of any colour or density, decorated with oxides of various metals, mixed with such glazes

as will preserve them, and produce their exquisite tints at a temperature between enamel and glaze kiln heats: in other words, biscuit earthenware decorated with coloured glazes, such coloured glazes being majolica colours.

Probably the amateur artist unacquainted with the beautiful specimens of Italian majolica which are to be seen at South Kensington and other museums, and

accustomed only to the common English majolica of the china shops, which may be bought for a few shillings, will be surprised to find, any mention, in a work of this kind, of such "common" colours. The writer feels, on the contrary, that if amateurs generally associated the term with such work as that produced by Luca della Robbia in Italy and by Palissy in France; far from despising majolica, they would desire to extend



their knowledge of a material which places in their hands yet another object upon which to leave the impress of their individual minds. To further this he begs to call their attention to such a little work as that upon majolica by Mr. C. Drury E. Fortman, F.S.A., which has been published for the Committee of Council on Education by Messrs. Chapman and Hall.

Majolica colours are very powerful and deep in

tone ; but depend for this quality upon the quantity applied to the wares, their brilliancy being increased by the variable blending of the colours consequent upon their accidental running together in the kiln. They are now divided into two classes—**Opaque** and **Transparent**—the opaque being adapted for such decoration as that known as " Luca della Robbia " (named from the fact of Luca della Robbia being the discoverer for Italy of the stanniferous or tin enamel glazing), beautiful specimens of which may be seen at present in South Kensington Museum. These opaque colours are used upon creamy or white bisquit surfaces, and are usually seen covering modelled shapes, figures, etc., in the round, and bas-relief. Luca della Robbia himself painted upon the plain flat surface with them. The following quotation from the South Kensington catalogue may be interesting :—

" Vasari tells us that Luca sought to invent a method of painting figures and historical subjects on flat surfaces of terra-cotta, which being executed in vitrified enamels would secure them an endless duration. Of this he made an experiment on a medallion, which is above the tabernacle of the four saints on the exterior of Or San Michele. . . . For the Bishop of Fiesole he also made a marble tomb, on which are the recumbent effigy of the bishop, and three other half-length figures besides ; and in the pilasters of that work he *painted* on the flat certain festoons and clusters of fruit and foliage so skilfully and naturally that, were they even painted *in oil on panel*, they could not be more beautifully or forcibly rendered."

We have here a record of the fact that Luca, simultaneously with his enamelled terra-cotta sculptures, also practised *painting* in the same vehicle on the flat, or in other words the art of " majolica painting."

There are two modes of doing this—first, a flat surface of white opaque laid on the biscuit and fired hard ; after which a subject may be painted on it in enamel colours and fired very softly—producing the fine soft effect of the enamel miniatures on metal enamels ; and secondly, tracing a black outline on the biscuit surface, and "plumping" on thickly between

the spaces of the design the opaque colours, and firing hard kiln heat ; when the finishing may be done with enamel colours at the lower heat of the rose-colour fire. Both of these processes are somewhat difficult, and require the practised hand of the painter already initiated into his work of enamel painting, and possessing a clear knowledge of the materials.

The Luca della Robbia majolica of Italy gradually

declined, owing to the public demanding cheap and consequently worthless articles. It was closely followed by the pottery of Bernard Palissy, in France. That indefatigable potter, in patiently attempting to imitate the opaque enamels of Luca, discovered the transparent glazes or semi-enamels, which, used upon modelled forms, soon became well known as "Palissy ware." The colours used for decoration of this kind are the "transparent" majolica colours.

Specific Work.

THE foregoing pages of this little work have been mainly directed to general descriptions of ceramic colours, and the methods of using them, irrespective of details of any particular work from an artist's point of view. It has been assumed that readers have already mastered the *technique* of ordinary drawing, and possess some knowledge of water or oil colour painting, and therefore only require to be informed as to the peculiarities of the ceramic colours themselves.

It has been suggested to the writer that it would be of service to many students to have one or two examples of how to proceed, step by step, in the execution of a painting on china; therefore a few practical hints will be given, such as learners have quently required at his hands.

"hat shall I paint?" is the first question asked the tyro. To this the answer is—Let the first essays be made in monochrome *on* the glaze—that is to say, with one colour heightened by one or two others. Photographs of casts or bas-reliefs afford

good copies for this purpose; there are also now photographs of flowers to be obtained at many of the best photographers' shops, which are eminently suitable for the beginner's first lessons.

"Shall I have a background, or shall I paint on a white surface?" is the next inquiry. Backgrounds soften or tone down the colours, while a white ground gives force to the subject simply by heightening its colours by contrast; therefore, if a background is desired, paint the subject the more forcibly, in order to overcome the softening effect of the ground; if a white ground, let the treatment of the subject be soft and light, or the work will lack that delicate harmony so much appreciated by all lovers of true art. Good colours for this purpose (monochrome) are red, shaded with Brunswick or chocolate browns, or Vandyke, shaded with German brown. Any of the colours which will shade themselves are suitable, but the learner is recommended to confine himself in his earlier efforts to red and brown—those colours being, as before mentioned [*see* pp. 29 and 37], more easily used than some of the others.

Having worked in monochrome, the student may begin by slow degrees to introduce himself to colours by carefully using such as are complementary to each other. By pursuing such a course, he will soon find out which colours will harmonize when used together; and having done so, he will be instinctively led, in like manner, to place side by side in a subject only such as will produce harmonious results. For in-

stance, he will naturally place in a group of flowers the purple-blue corn-flower next to the glowing buttercup if he wishes to heighten either, or the delicate blue of the forget-me-not with the pale orange of the ear of barley. The result will then be a work of art instead of a crude copy.

Although the complementary colours are generally known, it may be as well to repeat them for reference :—

Red,	complement	Green.
Yellow,	„	Violet.
Blue,	„	Orange.
Violet	„	Pale Yellow.
Orange,	„	Blue.
Green,	„	Red.
Indigo Blue,	„	Ochre.
Black,	„	White.

This is the natural order of the solar spectrum. All complementary colours agree, being of the order of nature.

It should be borne in mind that the rule as to the primary colours and their immediate complements holds good to their remotest tints. Just as positive red may stand by a positive green and be heightened thereby, so the faintest pink will be heightened by the juxtaposition of the palest Celadon green. It should always be remembered that a colour standing by itself, and the same colour placed by another, have a totally different appearance ; and this difference must always be judged of, and allowed for. For instance, as already

stated, red is always heightened by being placed next to green, and green leaves are always intensified by warm backgrounds (*i.e.*, backgrounds of a rosy or reddish hue). Every one will have noticed how a red poppy stands out by contrast with the surrounding green of the cornfield. These are the "*little*" things which an ordinary observer does not notice in a seductive little picture, but they are *the* things which give it the charm he acknowledges but may not understand, and frequently give rise to the expression one hears so often at a picture gallery, "What a charming little picture!—yet there's nothing in it at all."

With all this, however, the reader must bear in mind that all colours in nature are modified and softened by the all-pervading grey of the atmosphere. Grey may therefore be used with everything; but, as in nature, it should both give tone to, and take tone from, the colours which it modifies. Thus, for the ox-eye daisy, pearly grey should be used—for the rose a pink-grey—and for the distant landscape a blue-grey. These broken tints (or primitive colours containing grey) are the "shadow colours" of ceramic art.

Sketching the Outline.—There are three modes of producing the outline of the subject upon the china. The first which will be mentioned is that ordinarily employed by ceramic artists at manufactories, known by the term "sketching in."

The sketching material may be the ordinary Indian ink of our water-colour box, or smoke, which

is simply carbon collected on any spare tile, plate, or saucer, by holding it over a candle; these are both technically known as "sketch." The writer prefers smoke, as Indian ink is sometimes anything but pure, and consequently does not entirely burn away in the kiln, which smoke certainly will do. Smoke must be used with turpentine—Indian ink with water. A fine camel-hair pencil is necessary. The subject should be sketched carefully and lightly; for, if too much sketch is used, its depth will mislead the artist when painting over it. Another very simple and handy material to use for sketching is lithographic chalk, which will mark well even on the smooth surface of the glazed ware. As it is greasy and soils the fingers, it is better used in a crayon-holder. Care must be taken not to press too hard upon the china with it, as being brittle, it will break easily. If the subject is to be painted upon a ground of some dark colour, previously fired, of course light-coloured chalk must be used. It is obvious that with this mode a previous knowledge of drawing is necessary, and it is decidedly the best when a subject of some freedom is in hand, such as flowers or landscape; but when particular work or complicated ornamental lines are desired, or when the same design has to be repeated on a plate or other article more than once, such a mode is superseded by that known as

Tracing.—There are several modes of accomplishing this; one, however, will be sufficient to indicate the general idea, and the student probably will develop

it for himself according to the exigencies of particular cases. Buy or make some transferring paper. Common (not ceramic) rose-pink rubbed on paper, carefully dusting off the superfluous pink, or some crayon rubbed all over paper and made level with the finger, will answer the purpose. Rub lightly over the surface of the article to receive the tracing a soft pad of linen rag, on which is a very little turpentine, with perhaps just a drop or two of fat-oil in it—unless the turpentine itself is a little fat, which is mostly the case after it has been kept a little while. This leaves an almost imperceptible film, which must dry before the tracing is applied. Now place the transferring paper with its coloured side downwards on the ware: it is best to secure it with bits of gum paper (ends of postage stamps answer well); put the drawing, photograph, or tracing of either, on the top of it, and with a fine-pointed style go over the whole of the outline, being very careful neither to press heavily, nor to place the fingers heavily on it, as finger marks will show; now remove both papers together, and the outline will be seen on the ware. Care must be taken not to go over the same place twice, or double lines will be the result. Good tracing, however, is only a matter of a little practice. The third mode of producing the outline is known as

Pouncing.—To make a "pounce," place three or four thicknesses of cloth or blotting-paper solid on a table; lay on them a piece of paper—writing paper will do, without creases—on this, again, place a tracing of the design (as the process would injure the

design itself); now take a fine needle, inserted into the end of a stick for convenience of handling, and prick holes all along the lines of the design, about an eighth of an inch, or less, apart; the holes must go through the tracing-paper and the paper under it. To do this well, the papers must be held very steady, or secured by other means, such as a few bits of sealing or modelling wax. The needle in pricking the holes must be held perfectly upright, as a slight inclination to either side would produce distortion in the pounce. The pricking completed, turn the paper over on the table, and softly rub down the little roughness on the holes, either with a perfectly flat and smooth pumice-stone, or a little *very fine* sand-paper. If the latter be used, it must have been previously reduced almost to a smooth surface by rubbing two pieces together. The pounce is now ready for use, and will last for many years if kept flat and clean. To transfer the design, all that is necessary is to place the pounce on the ware, and rub through the holes, with a pad of cotton wool, either very fine charcoal, rose-pink, or any other vegetable colour.

The student, having now mastered the earlier stages of his instructions, and perfected himself in monochrome painting, is in a position to receive his first lesson in painting with a palette of varied colours. For this specific purpose the writer has availed himself of the permission kindly given him by the editor of *The Pottery and Glass Trades Journal*, to utilize some lessons contributed by an accomplished artist,

fully qualified by practical knowledge to deal with the subject, to that most useful and interesting publication.

In reprinting the directions given by any practical worker, it would be obviously unwise, and indeed improper, to substitute alternative methods at any stage for those given in the original. It is well known that the masters in any art have each their favourite courses of procedure, the relative value of which can only be tested by results which the student *must* work out for himself. The desire of the writer is to prevent, as much as possible, hampering the student; therefore he has avoided such introductory directions as do not correspond with the results of perhaps a more extended experience of ceramic processes than an artist could possibly have; while he has given very carefully the fullest details of such manipulations as appertain to the distinct sphere of the artist himself. Further, the writer has substituted the names and terms already used in this work to denote that which *The Pottery and Glass Trades Journal* has in other words described, purely in order to avoid confusion.

The flowers chosen to illustrate the first lesson are the

FORGET-ME-NOT AND WILD ROSE.

The artist says:—

" . . . . We cannot do better than give the colours required for their production in the first stage. We mix the colours on our palette so as to avoid

having to clean it so often. Yellow first; orange next; then Vandyke brown; then we clean and mix green. Next we mix rose-colour, and, in their order, neutral tints and azure blue. These are all the colours required for the first painting. Range the colours round the palette in the order mixed. Do not mix too much colour at once, as it spoils by dust and becomes hard by exposure. More yellow will be required than any other colour for the greens. The palette being now prepared, we turn to the plaque we propose to paint. It will be best to have the design clearly sketched in outline, giving more detail than is usual in water-colour painting before mixing the colours. *Do not make the colours too fat*, but rather the reverse; as when in use it is easy to touch the point of the pencil in the thin fat oil, and so help it to work better than when the colour itself is too fat to begin with. Having the design before him, our artist must choose which part he will commence to paint first—the flowers or the leaves. It will be best to have the plate slightly raised, as then every portion can be seen, and it will be in a good position to work on. We commence with the flowers. Rose-colour must be first used. Take one of the large shaders—the larger the pencil the greater will be the breadth, and, in the first painting, detail must give place to breadth. The artist must put aside the practice of water-colours, and make every stroke distinct and as near the strength of the colour as possible—always, however, keeping

slightly under it. If any colour goes over the outline it is easy to remove it with a pencil damped with turpentine. To do this, dip a clean shader in turpentine and then wipe it dry on the indispensable linen rag. It will thus remove any colour not required. Any colour can be removed, if not exactly the right tint, by means of a rag moistened in turpentine, without hurting the outline, if not rubbed too hard.

"After rose-colour, add the pearly-grey tints of shadow-for-white—the centre, pale yellow with orange seeds—then the delicate blue flowers of the forget-me-not, with yellow eyes. We next employ a light green for the high light of the leaves (when too green, mix with turquoise blue), which must be washed over very evenly, and crossed and re-crossed, to make them level and firm. Now mix the rose-leaf green with yellow, and that will give every shade of green required. The neutral tints of the back leaves come next. Some of them will be a pale rosy brown, and some a delicate neutral with edges just tipped with rose colour, or varied by delicate tints of pale green. These neutrals give quality and grace to the whole. Lastly, trace the stems with rose-colour and a little light brown, and add the pink thorns. The plate will then be ready to undergo the first firing. . . .

"We will suppose that the plate or piece of china painted with the wild rose, etc., has passed safely and satisfactorily through this trying process, and proceed at once to mix our colours for finishing.

"Our first colour is Dover green; this will be required to add to the shading green, to tone it down when in too violent contrast with the delicate yellow-green leaves; turquoise blue, to give the faint bluish tinge on the rose-colour—(this colour, used with delicacy, gives a charming airy appearance, so natural in the wild rose),—also to vary the tint of shadow-for-white. Shading green constitutes the main colour for finishing the leaves; it can be made by the admixture of browns and greens, but we think it advisable that the artist should obtain it ready for the palette. Next mix equal parts of Vandyke and German brown, either of which by itself will not give the required shade. Rose-colour and ruby follow—the last to add to brown to touch up the seeds, stems, etc.; blue for the forget-me-not; shadow-for-white for the flowers; and, lastly, white enamel: this last requires less fat oil than any other colour, as when too fat it cannot be used with advantage, as it is very liable to flow. Great care must be taken to keep it pure, as the least tinge will invariably spoil it.

"As a rule, smaller pencils are required to finish than to wash in the subject. Commencing with rose-colour, first wash over the dark shades; then with smaller pencils add the secondary tones, and sharpen up with spirit the points that tell with effect—such as the dark touches on the buds, and here and there the indentation in the flower; then use the shadow-for-white, with breadth and softness combined, always bearing in mind the light and shade so very essential to success, keeping the flower under the leaves in

shade, and low in tone of colour—that is, very faint shades of finish in rose-colour; and then wash nearly over with shadow-for-white the back petals and centre; the seeds can be connected by just wetting the pencil in turpentine, and removing the shadow colour to indicate their joining the centre. Then on the other flowers join the seeds to the eye, with a fine pencil radiating them so as not to destroy the hollow appearance. This is a very particular and difficult task, but by perseverance it can be accomplished. Now turn to the forget-me-not: it will only require a little study to make this charming flower appear natural. This may be done by various tints of the blue used in the first painting, touching the edges here and there, leaving the eye in the centre to be touched with brown when sharpening up the leaves with the same colour, and a spot of white enamel on each petal near the centre. Commence with the leaves strongest in shadow and colour, using shading green, following the form of fibres in the leaf with the pencil, toning down the shading green with Dover for delicate leaves, and using turquoise blue where intense secondary tones are needed. The delicate rosy brown neutral may next be added, then with brown and ruby touch the seed of the flower; let every touch tell, giving each seed a distinct character, varying in proportion as it is in light or shade, the light parts of the seed coming out from the shadows on the top of the flower, and the dark touch on the opposite side, graduating nicely. Sharpen the eye in the centre by a judicious touch of brown on the olive finish. We give the most minute

instructions on this point, for on the proper treatment of the seeds and centre the success or failure depends in a great measure.

"Then turn the attention to the stems; be very careful to maintain the flowing line running through and supporting the flowers and leaves, gradually becoming fainter in tone and strength of colour, as it loses itself, with only the slightest indication of fine line connecting the delicate neutral leaves. Give the thorns a touch of ruby near the commencement rather strong, dying away faintly towards the end.

"Lastly, with white enamel give the seeds a few touches, touching here and there the prominent parts of the flower and the intense lights of the leaves. Too much enamel invariably spoils the work, therefore be very sparing of it, and only use it after studying the effect it will have, and whether it would be of service in helping to secure the desired result; and our first example of simple flowers will be ready for its final firing.

A Group of Flowers.

"We shall now introduce the colours not fully described, and endeavour to explain their use and the difficulties connected with each. We have chosen the scarlet poppy as a suitable flower, and by its treatment hope to give an insight into the

use of red—one of the most difficult colours: difficult because of its chemical composition, that does not admit of being modified in the same manner as the other colours of our palette do.

"Red, the colour to be used in painting the poppy, will not mix with any other colour except ruby. This is one obstacle to the frequent use of this colour; for many students, forgetting the difference between enamel and water colours, use red in the same way that they would if painting on paper. They only look at the very charming tints it produces before firing, without giving a thought to the ultimate results.

"In the rich blue tints of the corn-flower we shall find a medium for making further progress in the knowledge of azure blue, the varied forms and shadow helping us to introduce the combination of ruby in a very successful manner.

"We paint the clover, with its ever-varying shades of rose-colour, according to the time it has been in flower, as it appears to us when just opening out in all its beauty, before the rays of the sun have taken from it the brilliant carmine tint.

"The ox-eyed daisy's yellow cushion and radiating petals against the background of faint blue enhance the pearly whiteness, and add to the grace of the group; whilst the ear of barley lends aid to give the airy appearance so necessary when painting the wild flowers we are all so well acquainted with: for, if we do not obtain that light and graceful effect, the finished painting cannot be called a success. If due attention

be not paid to this in the first painting, or, as it is technically called, 'washing in,' the second painting will not be a pleasure, but a toil, for none like to work at a study that stands no chance of becoming a credit to the producer.

"A mossy foreground gives the opportunity of blending the colours in sweet confusion. Care must be taken not to lay on the colours too thickly, or the result will be that they will boil up under the influence of the fire, and chip off, or 'blib,' as it is called by painters. When colour does so it very seldom looks well afterwards. Having given the general heads, we proceed to sketch the subject.

"Draw a straight line across the centre of the plate, then cross again; by so doing, the balance of the grouping is more likely to be maintained. Pay great attention to the sketching, as it will prevent much loss of time in the end, and be far more satisfactory. Keep the sketch lines as clear and fine as possible without confusion; do not use the Indian ink too dark, for if you do, the delicate shade of the sky and shadow-for-white will be overpowered, and you will be liable to put the colour on stronger than you require. Proceed to mix the palette in the same manner as directed in our first lesson. Mix red last; by so doing you will be able to avoid getting any of it into the other colours.

"The first colour in this study is the sky background; the colour used to obtain the required tint is azure blue, with the smallest touch of turquoise blue introduced here and there just to vary the tone.

Use your largest shader; do not have too much colour in the pencil—only just sufficient to give the tint that you desire. Wash the sky in as broadly as possible; soften the edges with the ball of the thumb, to tone the colour down and blend it with the plate. Remove the blue from the flowers: be very particular with the poppy, for if only the least vestige of blue be left it will cause the red to become dirty and spoil the work.

"Having finished the sky, paint the clover-bloom with rose-colour, touching with care to indicate each petal, and maintain the form. Be careful how you use your colour, toning it to give the roundness of the flower without heaviness.

"The corn-flower comes next: in the first painting keep the blue pure—vary the tone of the colour to give the cupped appearance of each petal—while the rich ruby centre forms a charming contrast to the blue. Ruby is a very powerful colour and very expensive, but a little of it suffices to obtain the desired tint; if on too strong, the enamel fire has no power over it, and leaves it a very disagreeable colour. The ear of barley can be washed over with light orange, and the faintest tinge of dark orange on the under side to indicate the shadow; the beard need only receive the slightest touch of colour in the first stage, but will require spirit in the next painting. Now add the pearly tints of the shadow-for-white on the ox-eye daisy, with the faintest tinge of yellow on each petal near the cushion-like centre; the centre will require a strong coat of yellow dappled with orange

to imitate the flower. The leaves may next be added, treating as directed in our first paper—that is, wash the Dover green or Sèvres green on, pale but firmly for the high lights, then with varied tones of yellow and rose-leaf green nicely blended to the required tones.

"Then the foreground of green, orange, and brown, with touches of rose-colour in harmony with the other colours, not strong enough to overpower the flowers. Lastly, the delicate neutrals and the poppy flower. The centre of the poppy must be painted when using the greens. Every other colour being finished, we proceed to paint the scarlet poppy. Red is a very pleasant colour to use: it works very freely. It does not alter so much as some colours do in firing, but remains nearly the same tint as when put on. Keep it a little lighter if in doubt. Wash over flat each petal first, then the stronger tones as broad as possible. This remark may be applied to every colour, for the broader the washing-in the more effective will be the finish. Having added the ruby seed round the centre of the poppy, our first painting of the example will be ready for firing. . . . .

"Proceed to prepare the palette for the second painting. Mix shading green first, Dover green next; it will be required to reduce the shading green to suit the delicate yellow-green leaves. If only shading green were used, the contrast would be too crude; but by judiciously blending the two colours, a soft, pleasant effect will be secured. If the student perseveres, and ascertains for himself, by

testing the tints most suited to the tone of the leaves, be they light or dark, he will achieve an important success. Light and dark brown (equal parts) for the leaves, and turquoise blue to vary the tint of the shadow-for-white, also to wash over the high lights of the leaves, and to give the sky a few delicate shades. Next azure blue for the corn-flowers and sky; rose-colour for the clover; ruby for the centre of the corn-flower, and seeds of the poppy; red, and white enamel.

"As in the first painting, the sky should first receive its finishing touches with a medium-sized pencil; use azure blue; do not have the pencil too full of colour, or it will give a heavy appearance instead of an aerial effect. Vary the tint with turquoise blue; be sure to keep the sky line horizontal with the foreground. Carefully remove from the petals of the daisy and the delicate-tinted yellow leaves any blue that may have accidentally touched them. If the blue be allowed to remain, it will spoil the purity of the tone of the leaves, and prevent the student obtaining the clearness so desirable when endeavouring to secure the pearly shadow-for-white of the ox-eyed daisy. It may appear strange to many who will read this that we should paint the flowers first in the washing-in, and the leaves first in the second painting. We will explain. In the first painting the flowers, being the principal feature, receive, as a rule, more attention than the leaves; the leaves, in the second painting, require more pains being bestowed upon

them, to indicate the fibres and shadows, leaving the flowers to be treated with greater facility, and the student is better able to observe the finishing touches required by them.

"Having finished the sky, turn next to the leaves, with shading greens of different tones, obtained by adding Dover green or browns to suit the tint. The principal leaves should have the broad shadow laid on first with shading green, using more brown when greater depth is required; then, with the finest tracer, give the sharp touches to indicate the centre fibres of the leaves.

"Do not conventionalise the leaves, but vary the tone of the finish, and do not trace all round the edges, but only here and there in those places where, after considering the study, you think a vigorous touch necessary to add force, without risk to the light and airy effect so essential to all wild flowers. Particular attention must be paid to the centre of the poppy flower, carefully to preserve the graceful radiating form, adding the shadows to indicate its peculiar shape with great care.

"With rose-colour, touch the clover bloom's countless petals, so as to convey the correct impression: a few minutes devoted to the study of the natural flower, held with the light falling on it from the left, will greatly assist the student in forming a correct idea of the manipulation required. The shadow required to indicate the globular form of the clover bloom must be added when the rosy touches have become sufficiently set or dry, to allow of the pencil passing

over without injuring their sharpness. If the shadow be washed over before the finish, the finish would appear crude and on the surface.

"Study well the peculiar form of the corn-flower's petals; pure blue may be used to give the required sharpness, to which colour ruby may be added to give the final touches to each starry petal; dapple the centre with pure ruby, used with discretion,—otherwise, if too thickly laid on, it will require too hard a fire for the red and rose-colour. The form of the touches should be small half-circles, darker on the shadow side.

"The yellow cushion of the ox-eyed daisy requires similar treatment to convey the requisite form; only the colour to be used in this case must be brown with a little rose-colour added. After finishing with brown, etc., allowing the colour to dry, wash over nearly all the centre with a nice tint of rose-colour, which will, when fired, give a very rich orange effect. Whilst the rose-colour is still moist touch the point of a clean pencil on the tongue, and take out a few spots of colour, leaving the pure tint of orange visible.

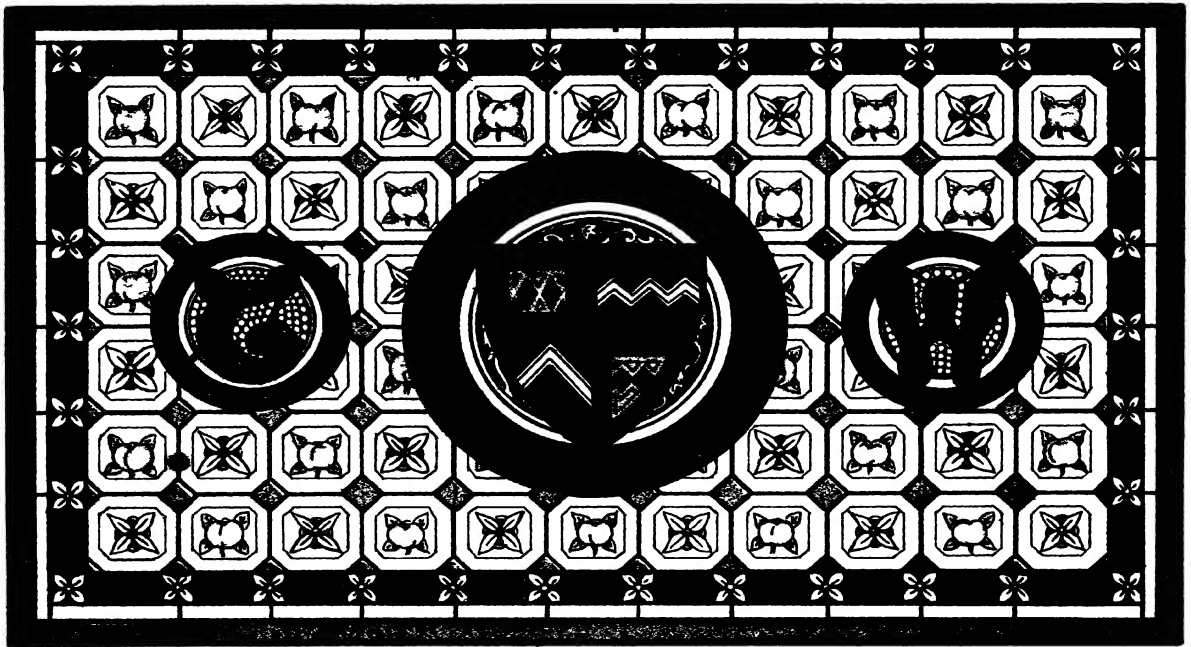
"With delicate tint of brown and turquoise blue indicate the grains and beard of the head of barley; be very attentive to the stem, so as to give it sufficient firmness to support its weight. The brown touches on the foreground must be added when using that colour for centre fibres, etc.

"The poppy must next receive our student's attention. The various tones may be secured by

washing over with pure red—not all over the flower, but only on such places as required; the dark shades can be made by the admixture of a small quantity of ruby to the red.

"The starry daisy we have left until the close of our lesson, since, by so doing, the painter is better able to judge of the requisite tints of shadow-for-white to give the flower its full effect. The seeds of the poppy require to be touched with ruby before they are finished.

"Then, with white enamel, touch the petals and centre of the corn-flower and daisy, mixing a little green and pure brown with the white enamel to give the mossy appearance to the foreground, and our second finished painting is ready to be gilt."



Design for Window Blind.

THE AMATEUR GLASS PAINTER.

"It is much to be desired that amateurs who can draw and who have a feeling for this particular style of art, should devote a portion of their time to its execution. They will find it to be extremely agreeable and pleasant, and the few difficulties which they meet with in their first attempts will be readily overcome by perseverance."

PROFESSOR BARFF, M.A., "*Glass and Silicates.*"

Glass Painting or Staining.

THE advantages of a knowledge of this beautiful work, and its place in amateur art productions, has been briefly referred to in the introductory portion of this handbook. Although the methods and the processes employed differ in some important respects from pottery painting, there is no reason why any one who can practise the one should not proceed to the other; while the peculiarities of working on glass which will be pointed out may even suit the style of some artists better than pottery. As far as drawing is concerned, the special feature of working on glass in all early styles is that the subject has to be indicated chiefly by bold general outlines rather than by the delicate detail which, however beautiful on a china plaque, would be lost in a general view of a stained glass window. The remarks already made as to the peculiar sphere of the amateur apply no less to glass painting than to ceramic art. Whatever may be done by devotees who have full time and means for the production of any work they please, it

is not worth while for amateurs generally to attempt such things as would be done to greater advantage in the professional studio. There is, nevertheless, a wide field for the exercise of the talents of amateurs; and it will be the object of the following instructions to put them in the way of practising the art with the least possible expense and trouble compatible with the production of really good work. As in ceramic processes, it is altogether undesirable for amateurs to waste that time and patience on the production of materials for working with, which would far better be devoted to their proper objects of skill in the carrying out of the design itself. The latter is just the domain where the individual taste of the amateur, which has been previously insisted on in these pages, comes into play; whereas the production of colours, stains, and other material appliances is a manufacturing process best left with the chemist whose business it is to make them.

It is as well to say this, because some writers upon the subject give voluminous directions and formulæ for preparing colours, stains, etc., which, though apparently clear and concise enough, are perfectly useless to the amateur, who naturally, not having a manufacturer's premises, with air furnaces, crucibles, retorts, steam engines, and colour mills, in the corner of his studio, can scarcely avail himself of these directions, even if he possess the special chemical and practical knowledge requisite to make the combinations at that precise instant which alone yields the result so easy to put down in print. And besides all

this, as a question of cost, the prices of the colours would be more than quadrupled.

Manufactured colours are specially adapted to the work for which they are prepared beyond the risk of failure, if used in exact accordance with the directions given.

As to the advantages of the art, it is unnecessary to add much to what has been already given. For **Ecclesiastical Work** it is of course pre-eminently suitable. Although glass is in one respect a fragile substance, by reason of its brittleness, yet as being, when well made and protected, independent of atmospheric influences, it is found practically to be far more enduring than stone, either for memorial or for simply decorative purposes. When inscriptions on stones have become illegible, and the stone itself is perhaps crumbling away, the memorial window, if properly protected, is as beautiful as on the day when it was erected,—and more so, for stained glass is one of those things which mellow and improve by additional age. It would surely give a touching interest to a memorial window, to know that it was painted by some loving survivor of the departed friend or relative whom it commemorates. Amateur stained glass is no less in place for ordinary church decoration—of course chiefly for lancet windows or other small lights—and would form a new outlet for the exertions of lady members of congregations, whose offerings have hitherto been confined to art needlework, etc. No insuperable obstacles present themselves to the complete execution of such work on the spot except the "firing" of the glass,

which can easily be arranged through the nearest agent who supplies the materials. A glazier will do all the fitting that is required, if furnished with the requisite directions. There is no place, next to the home, where it would be a pleasanter thing to point out to visitors one's own work than the church around which so many of our best associations are centred.

Domestic Decoration.—Here the amateur should reign supreme; and his domain is an extensive one, ranging from the hall, with its heraldic devices, to the town house, villa, or cottage with its pretty staircase window. In towns the stained glass portion of a window, or movable blind affixed to it, is particularly useful for preventing the intrusion of staring from passers-by in front rooms, or for blocking out unsightly yards or other places at the back of a house. And not only is stained glass thus directly useful, for it serves the higher purpose of aiding in the artistic decoration of a room, and, where used with judgment, so as to harmonize with the other decorative features of the apartment without overpowering them, the general effect will be refined and pleasing in the extreme. The true purpose of a window will be altogether destroyed if the colour is of such a character as to make the window the most prominent object in the room. The primary purpose of the window, which is to admit light, must never be lost sight of. It can be made to act a subordinate part, in relation to other decoration; and is then well suited for drawing-rooms and other apartments richly furnished:

or it can be coloured, and executed in such a manner as to flood a staircase with the most magnificent hues. Painted glass is suitable, and is eminently applicable, not only to drawing-rooms and staircases, but also to libraries, dining-rooms, conservatories, and fanlights; and even, in a simple form, to the windows of sleeping apartments. It is a matter of surprise that fanlights, forming as they do the most prominent part of the entrances to our dwelling-houses, should be allowed to remain, as many of them are, a disgrace to the inhabitants. As a rule, they are, without doubt, totally unworthy of the mansions they are intended to adorn. Here again stained glass can be utilized to a very great extent; either by the introduction of armorial bearings, or of subjects equally suitable. For library and drawing-room windows, painted glass is best arranged in the form of blinds, somewhat similar to the wire blinds with which we are so familiar. Constructed upon this principle, there is no absolute necessity for the removal of existing panes; and as they can be as easily removed as a wire blind, they afford every facility for cleaning. And it is a great mistake to suppose there is any external unsightliness in them; for, by the simple process of gilding the leads with which the pieces of glass are attached to each other, the great drawback, which at one time tended to prevent the introduction of painted glass into dwelling-houses, has entirely disappeared.

Such portable blinds also overcome another objection which may be raised to decorating houses by

THE MARTYRDOM OF S. PROTASIUS—from the Cathedral of Le Mans (France). Early 12th-century work. One peculiarity of this work is its extremely Byzantine character; another, the blocking out of masses to represent the hair, such as on the head of S. Protasius here. The ground is of the ruby called streaky; the dress of the Saint blue (azure), and yellow (pale). The executioner is in white, with dark flesh, and the foliage of a strong green. The enamel-like look of the design will also strike the reader.– *N. H. J. Westlake.*

means of stained glass. Very few people, especially in London and other great towns, are the absolute owners of the houses which they occupy; and there is a very natural disinclination to spend money on improvements which may at some future time be appropriated by a landlord. In such cases as that it is a very simple matter to have one of these movable blinds filled in with stained glass, and fixed, simply by hanging with hooks, to the window or fanlight; and the effect will be just as good as if the work were put into the window-frame itself. There is no reason, therefore, why any household may not have beautiful specimens of stained glass decoration.

Styles of Glass Painting.—As this is intended as a practical little handbook, simply giving in a condensed form the necessary directions for the work referred to, little will need to be said of the history of stained glass, beyond what is desirable for the purpose of enabling the student to distinguish one style from another. For the sake of facility of reference, the methods of glass painting may be termed the "Mosaic," the "Enamel," and a combination of the two—the "Mosaic Enamel" method.

The Mosaic Method.—This is the style of work which was practised from the earliest possible times down to about the middle of the sixteenth century. Glass paintings executed by this system are composed of several pieces of various coloured glasses, arranged somewhat like a mosaic, the pieces of glass being cut to correspond with such parts of the design

as are similarly coloured. Subordinate outlines and shadows are then painted on in a black or brown opaque vitreous pigment, which is afterwards fused or melted into the glass by means of heat in a kiln. After being fired, the pieces of glass are joined together by means of grooved leads, which usually form the main outlines of the design. This style of painting, notwithstanding its simplicity, is susceptible of the most beautiful effect: and most of the fine windows which claim our admiration for their magnificent arrangement of colour are executed according to this system. It should be remembered that as this method results in solid and heavy masses of colour, it is better suited for the purpose of hiding unpleasant exteriors than for transmitting light.

Enamel Painting.—The second method practised by the glass painter is the "Enamel" method. It will perhaps be as well to give here some slight account of the process of colouring glass. There are four methods in use. First, staining; which is only practicable in the case of the various shades of yellow. Secondly, by the use of pot-metal: that is, a glass to which the colouring matter has been added whilst in the pot. Thirdly, by the use of flashed glass: that is, a glass which, being originally white, has had in the course of manufacture a thin sheet of coloured glass melted on it; and, fourthly, glass which is coloured by the process of applying enamels; which are fusible fluxed colours, that are applied to the surface of white glass somewhat upon the principle of oil painting. This mode of colouring

glass is the system termed the "Enamel" method; and it is that which is most suitable for small subjects of any kind—for window blinds, etc.—so long as the proper glass for the purpose be chosen. [*See* IMPLEMENTS AND MATERIALS.]

The "Mosaic-Enamel" Method.—This is, as its name implies, a combination of the two methods already described. It is undoubtedly not only the best method for large work, but the most suitable for the amateur to undertake. By this system of painting, every description of white and coloured glass can be used, as well as every variety of enamel and stain.

The different colours of the composition are not, for the most part, produced by separately staining the component parts (except in the case of yellow, which is the stain in most general use), but by cutting the portions of robes, drapery, leaves, etc., from glass of the requisite colour, and joining these pieces together by leading.

Implements and Materials.

MANY of the articles here enumerated have been already given as requisites for the china painter, but in order to make the list complete as it stands, some of them may possibly be mentioned a second time.

Arm Rest.—This is made of wood, and is about two feet in length, two inches in breadth, and is raised to the height of about two inches by blocks of wood placed at each end. It is intended for the purpose of giving freedom to the hand.

Easel.—The easel that is used differs but little from the ordinary easel, except that it has a piece of tissue paper or thin glazed calico pasted on the back of it, to soften the effect of light.

Diamond.—The diamond which is used for cutting is the bark or outer coating of the natural stone. The spark, as the diamond itself is called, should possess an edge perfectly convex, and should be one whose edge or cutting point has not been produced by the art of the lapidary.

Brushes.—A few camel and sable hair pencils, for tracing and painting.

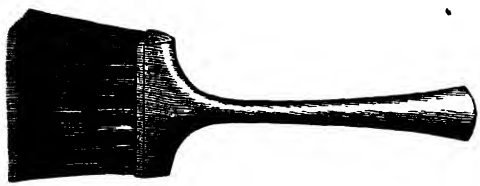
A few flat camel-hair brushes, in tin.

Hog-hair brushes or French tools of various sizes, for making scrubs.

A badger, for water matting.

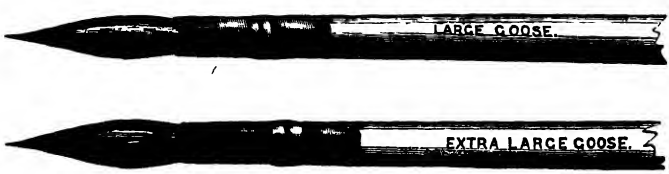
Ditto, for oil painting.

Keep all the brushes clean. After using, carefully wash them with warm water and soap; but do not allow them to remain long in the water, so as to soften the hairs or loosen the handles.

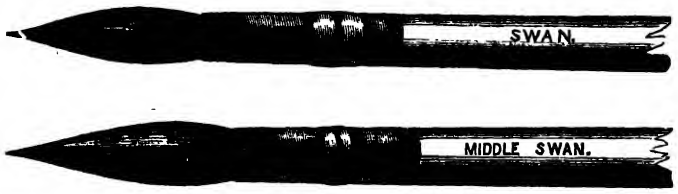


Badger-hair softener or blender.

Flat French tool or hog-hair brush or making scrubs.
[This brush is required in various sizes.]



Sable-hair pencils for painting in tar.



Sable-hair pencils for painting in tar.

Camel and sable-hair pencils for tracing.

A few wood etching tools.

One or two glass mullers and slabs.

Palette knives of various sizes.

To these requisites may be added trays for containing the work, lead pencils, a few sheets of drawing paper, some continuous cartoon paper, and some glazed calico.

GLASS.

The chemical formation of glass has been so well described by Professor Barff, M.A., in his admirable little work "Glass and Silicates," that a lengthy quotation will be given :—

"The materials used are principally sand, with an alkaline substance, either a salt of soda or potash, and lime, though in some kinds of glass oxide of lead takes the place of lime. . . .

"The scientific name for sand, or more properly for its principal constituent, is silica. This compound silica, or oxide of silicon, also called silicic acid, possesses properties similar to those which belong to other acids—*i.e.*, it is able, when brought into contact with bodies of an opposite character under suitable conditions, to unite with them and to form salts. Everybody knows

that if tartaric acid be added to carbonate of soda, an effervescence takes place : carbonic acid passes off in the gaseous state, and the residue is composed of a portion of the tartaric acid, which unites with the soda, a double decomposition taking place. If silicic acid * be mixed with carbonate of soda, and if the mixture be heated to a high temperature—*i.e.*, to a white heat—for some length of time, the same kind of action occurs : carbonic acid goes off, the silica or silicic acid uniting with the soda ; and insomuch as the soda salt was originally called carbonate of soda, after this action, in which carbonic acid is replaced by silicic acid, it is called silicate of soda. Silicic acid at the ordinary temperature of the air, and in the dry state, has no action whatever upon carbonate of soda, but when heated sufficiently the action becomes vigorous. . . .

"When sand is heated with oxide of lead—common litharge —they unite, forming a compound similar to that produced by the silica uniting with the soda. In the first case a soda glass † is formed ; in the second a lead glass ‡ is the result. If these two glasses be mixed together and melted in a crucible, and if the proportions in which they are mixed be properly adjusted and the materials used be pure, a colourless and transparent glass will be formed, similar in appearance to that which is employed in the manufacture of decanters and tumblers. The same kind of glass may be produced by mixing all the materials in due proportions and heating them together. If, instead of oxide of lead, lime be mixed with carbonate of soda and sand, and the mixture be heated to a high temperature, a glass will be formed in many respects similar to that of which oxide of lead is a constituent, but differing from it in several important particulars."

Professor Barff has in his book often repeated the very necessary remark that the right proportions *must* be used in order to produce a *good* glass—*i.e.*, one which will withstand perfectly the variations of the atmosphere. In order to make the reader

* Sand.
† Silicate of soda.
‡ Silicate of lead.

thoroughly understand this, it is as well to say that if silica is in excess the glass is hard, while if alkali predominates it will be soft.

Two parts of alkali and one part of silica melted together will produce a glass, but it will be soluble in water; equal parts of alkali and silica make glass which will not dissolve; two of silica and one of alkali produce a good glass; while one of alkali and six of silica will result in an intensely hard one. It is obvious, therefore, that whatever the alkali used, it must have its proper proportion of silica, otherwise some free and consequently soluble alkali will be left, which, in course of time, will be acted upon by the damp in the atmosphere and dissolved, to the detriment of the glass itself. This is the cause of the rough and honeycombed appearance of some old glass.

Perfect glass is a true definite compound, which upon analysis will be found to contain only definite silicates, and without any other materials which have not entered into complete combination. Unfortunately, however, this is frequently not the case; consequently we have examples of glass which have been exposed to atmospheric influences for long years anything but satisfactory: probably this is entirely owing to the increasing desire in the present day for "cheap," and consequently "nasty" things; for that the manufacturers of glass do not know this cannot for a moment be imagined.

Not only does this imperfect compounding and improper preparing of glass result in a disintegration of its own substance, but render it extremely diffi-

cult for manufacturers of colours to be *certain* of results. Their compounds are made for perfect glass; but as they are called upon to produce colours which will work and fire upon glasses of various degrees of hardness with the same results, the task is no easy one.

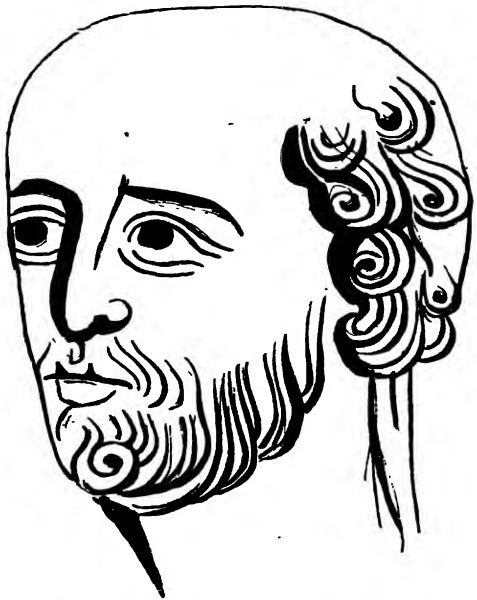
Various kinds of glass are used in leaded windows in the present day, the commonest of which is

Sheet Glass.—This was formerly known as "broad glass." It originally came from the Continent, but owing to the importation of foreign workmen (principally Belgians), its manufacture has extended to this country, and the commercial energy of English makers has so far developed the trade that now the English is equal if not superior to the foreign. This sheet is the ordinary white and coloured window glass, and similar to the old crown, but differently made in order to avoid the mass of glass where the workman's punt was fixed, generally termed the "bull's eye," which every one will remember to have seen in the panes of old cottage windows.

Sheet glass is now seldom used in the painted windows of the best artists, (if at all, only for the heads of figures,) preference being given to that kind known as

Rolled Glass.—This has a wavy appearance, and is semi-transparent; it admits light, but cannot be seen through from a distance. It may be obtained in all colours—principally white, yellow, light and dark buff, straw, deep and pale hay, grey, and green. These are termed "cathedral tints." Rolled

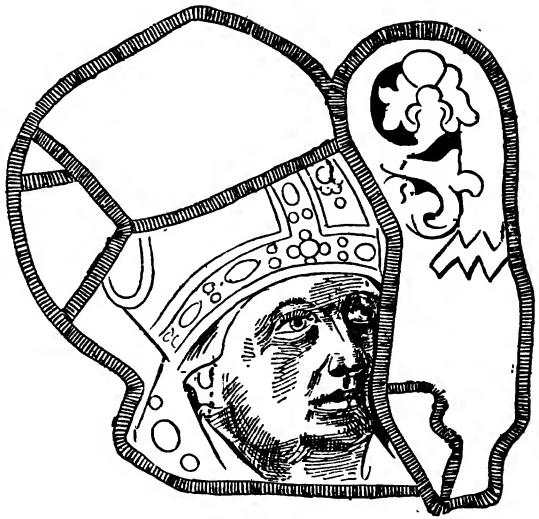
[These four sketches of heads show the different methods of drawing. Three Bishops' heads and mitres are given, to render the comparison easier.]



Early thirteenth-century, from Lincoln, showing style of tracing, features, and hair, in detail.

Head of a Bishop. Early Decorated style, from west window, Rheims.

Bishop and mitre. Early Perpendicular work, from one of the chantries, King's College, Cambridge.



Late Perpendicular. Head of a Bishop, from Fairford, Gloucestershire.

white is safest and best adapted for the purpose of painting upon by the amateur; it is hard, and will take a large quantity of stain. All kinds and colours may be traced upon; but manifestly on the dark shades of coloured glasses the tracing is lost to a great extent.

Antique Glass is largely used now to reproduce the twelfth-century work. It is pot metal—*i.e.*, coloured throughout,—and consequently very expensive; its colours are extremely rich and deep. For the earlier styles only a small number of colours should be used; but in the later (Gothic) a larger number may be sanctioned, and the glass itself may be somewhat less thick. A general fault is the use of too little white glass and too many colours, and for the sake of economy, the admixture of antique and cathedral glass.

Another kind of antique glass is made termed "Bubble Glass;" it has an artistic effect, particularly for painting flesh upon.

Mention has been made of glasses coloured throughout as "Pot Metals"—that is, coloured by mixing various oxides with the glass while it is in the glass-pot. For instance, protoxide of iron colours glass green, peroxide a brownish-yellow; sub-oxide of copper produces red, protoxide green; oxide of cobalt imparts a blue, oxide of silver yellow, and so on.

Besides this, another coloured glass is used, made by coating white glass while hot with a thin film of coloured; it is distinguished from pot metal

by the name of "Flashed Glass." It is only coloured on one side, and is consequently cheap. It is extremely useful for ornamental purposes; for by eating out the coloured side by means of fluoric acid patterns may be produced otherwise very tedious and difficult. (*See* USE OF FLUORIC ACID.)

Opal, or rather **Flashed Opal Glass,** presents a good field for the amateur to develope his talents upon. This glass is opaque, and must be painted with enamel (china) colours, to look *at*, not through.

These few varieties of glass will indicate sufficiently to the amateur what to select for particular kinds of work; and combinations will doubtless suggest themselves to him as he becomes more experienced in the manipulations.

Description of Glass Colours.

GLASS colours are made of metallic oxides, to which is added flux. They have all sufficient fusibility to adhere to glass at a certain heat without melting the glass to which they are applied. The amateur is dissuaded from attempting to make or mix his own colours. There are difficulties arising out of the variable contractibility of the glass and the pigments, which often deter people from proceeding with the art when the colours have been prepared by themselves, which difficulties being well known to manufacturers, have been completely overcome, and provided for in the composition of the colours. The colours which come from the best houses are in some cases the products of generations of experience acquired in selecting and mixing the ingredients, in order that they may chemically combine with the glass. However well colours for glass are made, one precaution must be kept constantly in mind: they *must be fired well.* All of them are prepared to melt just at the exact heat at which the glass itself begins to fuse on its surface; and if that heat is continued

for a little, they will be thoroughly vitrified, and will be then as imperishable as the glass. Their fluxes are compounded with the greatest care, just as Professor Barff has recommended for the production of good glass (they are, in fact, glasses themselves); but they, like glass, must be thoroughly melted. The writer has seen colours on windows, the thin parts of which were secure, but the thicker shades only half vitrified. Consequently, when such windows stand any length of time subject to the atmosphere —particularly where they can be acted upon by the fumes of gas—they are gradually destroyed. In his possession are two pieces of glass painted by the same man, which have stood some time in a church window: on one the colour is perfectly sound and good, but the glass itself has been acted upon and is full of holes; the other has the colour full of holes, and partly eaten away, while the glass is sound as on the day it was made. In the first the glass was originally bad; but the colour having been well fired, was thoroughly vitrified, and had protected the glass on which it was placed; in the second the glass was good, but the colour had not had sufficient fire, or had been sulphured in the burning. Both were painted with the same colour.

This may appear to the amateur a digression; but as this little book may fall into the hands of the professional artist, the writer deems such a caution necessary, particularly as he has more than once been called upon to explain the cause of such a disaster

The colours in this section will not be taken alphabetically, as the enamel colours were, but arranged in the order in which they are used. The tracing colours will take the first place, and the most important of these is

Brown.—Tracing brown is a colour resulting from much experience in stained glass matters, and when thoroughly fired is very safe and trustworthy; it has been prepared from the same recipe now at the writer's works for the past fifty years, and is in regular use by the leading artists in England and abroad. It is somewhat hard, and *must have* a good fire. In tint it is a rich red-brown, admirably adapted for diapering backgrounds and tracing ornaments generally. It must be painted solidly and strong. It is not well to use it for flesh. It may be mixed with ancient brown, Chinese red, sepia brown, and black shades. Beware of using flux with it in order to make it fire more easily; it is already properly prepared, and *must* have the fire necessary to fix it.

Ancient Brown.—A colour made to represent the tint found on ancient glass, for one of the principal glass artists of the present day, since which time it has come into general use. It is useful for tracing and for painting flesh; but care must be taken not to paint it so thickly as the tracing brown so called, or it will look sooty.

Umber Brown.—The name of this colour sufficiently indicates its tint—which is somewhat warmer than "ancient," but perhaps not quite so solid. It is useful for tracing ornaments, matting flesh, and

shading flesh tints, and also for painting hair. It is best used alone.

Vandyke Brown.—For the tint of this colour the reader is referred to the test plaque of enamel colours for china, as it is prepared to represent on glass for transparencies the same tint as that used upon porcelain. It is an exceedingly useful colour, and will mix with most others. Vandyke is a good solid colour when painted thickly.

Hair Brown.—This brown also may be judged of as a transparency by consulting the china test plaque. It mixes with Vandyke, sepia, pink, and crimson. Paint somewhat thickly.

Sepia Brown.—This brown resembles the sepia of the water-colour box, and mixes well with Vandyke and hair browns, pink, purple, and crimson.

Chinese Red.—This is similar to the flesh red, but of a darker tone; it may be used alone, or to shade flesh with. It is a useful colour, and does not fire away so much as the flesh red; but, like it, cannot be mixed with orange.

Flesh Red.—A colour in general use for painting flesh, of course on white glass. It may be shaded with Chinese red, ancient, umber, or tracing browns. It is somewhat transparent; this must be borne in mind when using it. For backgrounds, or tinting flowers or ornaments, it is also adapted. Care must be taken to paint it somewhat strong, as it weakens in the firing.

Black.—Tracing black is a very useful colour where a stronger tint is required than tracing brown

would produce. It is very solid and opaque, but not so dense as strong or jet black.

Strong Black and Jet Black.—These are powerful colours; the former has a bluish hue, the latter a brownish; both are very intense. They will mix with most of the colours with safe results. The same cannot be said, however, of

Soft Black.—This powerful colour is nevertheless very useful for putting in a keen shadow at the last moment, after the other work is completed; and as it will fuse at a considerably lighter fire than is required for the other colours, they will not be affected thereby. Let not the artist be beguiled by its depth and richness into using it largely in general work, for if it has a little too much fire it will turn blue, and destroy the effect he had fondly imagined complete.

Black Shade.—This is a very useful colour for general shading, saving the artist the trouble of mixing. It is a warm black, and very reliable.

Blue.—A very rich ultramarine colour, of the greatest depth. Unfortunately, Nos. 1 and 2 cannot be kept in a ground state, but must be ground for use by the artist himself as he requires them. This does not apply, however, to the No. 3, which is a delicate bird's-eye tinted blue. Each of these colours requires painting thickly to produce depth. Yellow stain at the back of the glass on which blue is painted will produce green. Though these are exceedingly useful colours; where large masses of blue are required, blue glass should be used.

Green.—This is a semi-opaque colour, which is very

useful for painting where it may be neither desirable nor convenient to introduce pot metal.

Crimson.—A deep rich crimson lake. This colour is an expensive one, owing to its being made from gold. It is a fine colour ground-laid [*see* GROUND-LAYING], and grounds laid with it on white glass, and patterns picked out before firing, have a fine effect. This colour mixes well with Vandyke and hair browns, purple, pink —in fact, with most of the colours.

Purple.—A rich velvety crimson purple, used similarly to the former where a different tint is desired.

Pink.—A delicate pink rose colour, adapted for grounds and light tints. It will mix as directed for purple and crimson. The admixture of a little orange (not stain) will produce a pleasing flesh tint.

Glass Enamel.—Beautiful effects may be produced by means of this enamel on glass ornaments to decorate the cabinet. It may be plumped on, as directed for enamel in the china section of this handbook ; and if the flowers of a subject are painted in it thickly, fired, and then tinted with china colours, and the connecting stems put in with gold etched up with brown, such as sepia or Brunswick brown china colour, a really fine effect will result.

White Mat.—This colour produces the same effect as ground glass. It should be ground-laid [*see* GROUND-LAYING], and after firing may be painted upon, with good results. Or upon flashed (say orange) glass, lay a coat of mat, and before firing pick out a pattern upon it ; the edges of this pattern may be cut up with a dark colour, and a surprisingly good result be obtained thereby.

Orange.—A colour of limited usefulness for glass; it may, however, be sometimes necessary for touching draperies, but it must not be mixed with red.

Yellow.—*The remarks upon the above colour apply also to this.*

Yellow and Orange Stains.—*It is perhaps unnecessary to describe these here; their names indicate the tints sufficiently, and the reader is referred to the notice of stains in* PROCESSES AND MANIPULATIONS.

Flux.—A glance at the description of flux in the pottery section will enable the reader to understand its use here. In experienced hands it may be sanctioned; the artist is, however, cautioned against its general and indiscriminate use, glass colours being always sufficiently fluxed to fasten them at the heat to which they should be subjected. They are not required to appear bright upon the surface, and if they are not fast when fired, it is only because the fire has not been given which they require and must have.

Gold.—It is a matter of some surprise to the writer that gold prepared for glass has not come into general use: even in the present day glass mosaics are done with leaf gold, either coated over with a flux, or covered with another piece of glass. Gold is prepared by the writer to use upon glass in the same manner as it is used upon porcelain. The reader's attention is directed to the instructions upon that head in the earlier portion of this work.

Processes and Manipulations.

PREPARING THE DESIGN.—The first step in the execution of a stained glass painting is the preparation of a full-sized design or cartoon, upon which are marked the shapes of the various pieces of glass, with the patterns which are to be painted upon them. These are to be clearly and legibly drawn, as by doing so it will considerably facilitate the progress of the work in its future stages. A piece of ordinary thin glazed calico, or tracing paper, is then laid upon the cartoon, and a skeleton tracing made, showing only the outline of each separate piece of glass. This is technically called a "cutting drawing," and is intended for the purpose of cutting from and for glazing on. This separate drawing is not absolutely necessary, as the cartoon itself could be used for the purpose; but as the design is sometimes of considerable value, and may be required at some future period, it is advisable not to expose it to the risk of unnecessary damage. The cut line may also be found very useful for laying the pieces of glass on while painting. It is well to indicate on the cutting drawing the colours to be used.

In making both the drawing and cut line, it must be borne in mind that the shapes of the pieces of glass must in every instance be as simple as possible.

Cutting the Glass.—The next step after making this drawing is to get the glass cut. This operation is a purely mechanical one, but requires a considerable amount of practice and skill: and consists in laying a piece of glass of the colour required upon the cut line, and cutting it exactly to the shape by means of a diamond. Should the glass be found to be too dark for the shape to be seen through, it can be breathed on, and a little fine whiting dusted on it from a pounce bag—which is a small piece of linen or fine muslin tightly tied, containing some fine dry whiting; and then by placing it beneath the drawing, and following the lines with a pointed stick, the shape will be found marked on the glass, and can be easily cut. Although these instructions are given on the subject of cutting, yet the reader is strongly advised to transfer this branch of the business to the regular workman, whose services can easily be obtained.

Matting the Surface.—Having laid out the pieces of glass which are to be painted upon the cutting drawing, they should be well cleaned to remove all greasiness. The next operation is to trace the outlines of the patterns drawn upon the cartoon, on the upper or cut side of the glass, and this may be done either in water colour or in oil. The greatest difficulty in glass painting arises from the tendency of the pigment to wash up, in consequence of there not being on the surface of glass, what practical painters

call "key," or "tooth," and a second stroke of the brush frequently takes off that which the first has deposited. To obviate this difficulty, some foreign artists paint only on glass whose smooth surface has been removed by rubbing with sandstone or emery—ground glass, in fact—but this spoils the effect completely; for the brilliancy being utterly destroyed, the painting is no better than those paper imitations of stained glass sold under the name of Diaphanie. A far better method of overcoming the difficulty is to mat the glass with colour. To do this, take a little painting colour and grind it on the slab with the glass muller, and, after mixing a few drops of solution of gum with it, lay a slight wash on the surface of the glass with a flat camel-hair brush; and render it even by drawing a tool, termed a badger, across it in various directions until it is of uniform smoothness. It must be particularly borne in mind that the gum must not be in too great a quantity, as then there would be a difficulty in removing such portions of the mat as might require it.

Stippling.—There is another method of putting the mat upon glass, which, when executed in a proper manner, is very effective—especially in large work, where there are considerable masses of shade. It is termed "stippling," and is managed by laying a water mat upon the glass, and rapidly dabbing it whilst in a wet condition with the end of a brush made expressly for the purpose. It gives a peculiar granular effect to the mat, and is much to be preferred to the flat mat for intense shadows. It is,

Thirteenth-century figure and canopy, from Bourges Cathedral, France.

Fourteenth-century figure, and figure and canopy, from S. Ouen, Rouen.

Fifteenth-century figure and canopy, Winchester Cathedral.

[These slight sketches will show at a glance the differences of style that a hundred years (there being probably that interval between each specimen) made.]

however, rather difficult to manage properly; and, in unpractised hands, is apt to produce a peppery appearance.

Tracing the Design.—The piece of glass is now laid upon the drawing, and the pattern put on it with the tracing colour by means of a small brush, termed a tracing pencil. During the operation of tracing, it is usual to employ the assistance of a rest. To trace in water proceed as follows. Procure a glass muller and slab, and a glass of clean water, take a little of the pigment used as tracing colour, (it is immaterial whether it is brown or black,) and with water grind it to a smooth paste; and then with the addition of either sugar, a few drops of a solution of gum arabic, or a little treacle, the colour is ready for use. In the case of mixing colour for oil tracing, it must be ground up in turpentine, and fat oil substituted for the sugar, treacle, or gum. The object of these vehicles is to facilitate the laying on of the colour, and to cause it to adhere more closely to the glass.

In tracing work, be careful to keep the pattern well within the edges of the glass: recollect that the lead used by the glazier will require at least a sixteenth of an inch all round each piece; and if this is not borne in mind it is quite possible the tips of fingers, etc., may be cut off in an absurd manner, and the glazier be blamed, when, in reality, the fault lies with the painter.

In some domestic work the ornamentation of the glass goes no farther than the tracing, with the exception of certain portions of the patterns on the white

being stained with yellow; but as there are other means employed, beside this, to give a richness of effect and body to the work, they will be briefly described.

"Tacking" the Colours.—If the glass has not been matted previous to tracing, and has been traced in water, it is necessary that it should be fired in a kiln in order to "tack" it, or, in other words, to attach the colour by means of heat to the surface of the glass. This burning need not be very great—the only object being to enable the colour to withstand the action of both water and oil, and to prevent the tracing from rubbing up in subsequent operations. If, however, the tracing has been executed in water colour on a mat, this preliminary firing is unnecessary. But should it have passed through the kiln, carefully wipe it, and lay an even water mat as before described, and then proceed to take out the lights.

Taking out the Lights,—must be done before burning. The process is as follows: — Procure some flat French tools or hog-hair brushes, and burn their working ends down to about half their length. This is done by placing the bristles or hair sideways on a bar of red-hot iron, and afterwards rubbing them on emery paper. According to the stiffness of these "scrubs," as they are termed, and the quantity of gum in the mat out of which the lights are to be taken, so are they more or less easily taken out. It is usual for the glass painter to have several of these scrubs—of different sizes and lengths of hair—suitable for various widths of lights and various

thicknesses of mat; and it should be understood that the quantity of gum in the colour to be used for a light mat must not be nearly so great as that intended to be used for a dark one. These brushes, when drawn across the surface of the mat, remove a portion, varying according to the pressure put upon the scrub; and a great deal depends upon the manner in which the pressure has been directed and regulated, as to whether the result is merely an unmeaning "wipe" or the effect intended. Should there be an error in the taking out of the lights, it is better to wipe off the mat and to commence afresh, than to allow any portion to remain that is incorrect. Avoid all unnecessary scratches and wandering brush-marks; they show a want of decision that inevitably causes the work to betray itself as the effort of a beginner.

Readers are advised to make themselves thorough masters of this branch of painting, as there is more art knowledge and manipulative skill required in this apparently simple process than might be supposed. Excellent effects can also be obtained with styles of fine-grained wood, pointed in front and smooth on the back, and which are sold under the name of etching tools.

"**Sticking-up.**"—The foregoing operations are executed on the pieces of glass in their separate state; but in large work it is usual to "stick up the work," as it is called, before taking out the lights or commencing to paint. This is managed in the following manner:—A piece of rolled or plate glass, sufficiently large to take in the subject or portion of the window

to be painted, is laid upon the cutting drawing, and the pieces of glass in their proper positions placed upon it. Bees'-wax, with or without the addition of a little resin and pitch, is then melted in a pipkin, and dropped from the point of a knife at the corners of each piece of glass. This causes them to adhere so strongly to the large sheet, that the whole of the work can be raised without any difficulty or risk. In this condition it is placed upon an easel; when the general effect may be studied, injudicious colouring altered, and pieces that are found to be too dark removed to make way for pieces that are lighter. From this stage onwards it will be advisable to execute the painting as far as possible on the easel—placed, of course, so as to throw the light through, not on the work. By this means the proper depth of colour in tracing may be judged of, and spottiness in shading avoided.

Painting in Tar.—The work is now ready for the next stage of the process of painting, which is called painting in tar. Having a little rectified spirit of tar in a glass, grind the painting colour with it—being careful not to make it too thin—and then add the least possible portion of fat oil to keep the colour open, and prevent it drying too rapidly. Now take a flat camel-hair brush, similar to the one used for laying on water mats, but in this case termed a wetter, and, dipping it lightly in the tar, apply it to the surface of the glass it is intended to paint; not using the brush too full, as the tar is apt to run on the back of the glass and make the colour

very difficult to manipulate. It should be evenly applied, or the painting will have a very disagreeable appearance.

This done, paint, with either a camel or sable hair pencil of a suitable size, the intense shades and half-tones that are represented on the drawing. Let every touch be decisive; in other words, do not put the colour on the glass until its proper position is decided upon; and, by thoroughly entering into the spirit of the subject, the work will, when finished, convey that feeling and expression which are the very life and soul of art. During the execution of this part of the work, it is imperative that there should be an entire freedom from dust, that the colour should be well ground, and that the spirit of tar, used for the purpose of grinding the colour, should be kept clean. Should the colour by any accident get dirty, or show any signs of seediness, it is much better at once to throw it away and mix fresh; as with dirty colour it is impossible to paint with any degree of satisfaction.

After the work is painted, it must be allowed to stand a few hours until it is partly dry, when a few high lights may be taken out with the etching tool before mentioned; after which, having become thoroughly dry, it may be taken down from the easel, the wax removed from the edges, and the work itself placed in trays, to be fired.

Enamelling.—Should any portion of the work require a coat of enamel—such as the flesh of the figures, or parts of the draperies,—take a portion of

finely-ground enamel of the colour required, and apply it to the reverse side of the glass. It will, however, be as well to fix the painting colour by firing before doing this, as both the painting pigment and the enamels flux better when fired colour-side up.

Stains.—Glass staining differs from enamelling in this: that whereas enamels contain a certain proportion of fusible glass or flux, and adhere only to the surface upon which they are painted, stain contains no flux of any description, but has within itself the power of penetrating and colouring the glass to a certain depth with various fixed colours.

The colouring matter of stain is silver; and although there are nearly a dozen different kinds of stain, they all contain as a base this expensive metal. Yet, although silver itself contains the elements of a stain, it must not be imagined that every glass is susceptible of taking it alike. Some kinds of glass there are which it is impossible to stain; whilst others can be scarcely touched with the silver without, on being fired, striking an intense orange.

Nor does the difference in the glasses end here. In some the stain will penetrate to a considerable depth, whilst in others it will merely lie upon the surface in somewhat the same manner as an enamel. The difference is caused by the variations of the proportions of the alkalies in the glass. It is always advisable for the amateur, as well as the professional, before commencing to stain his work, to make a proof: that is, to put a little stain on a piece of the same description of glass as that which he intends to use

and then fire it, by which means he will be enabled to judge of the effect which is possible on that particular kind of glass.

Do not introduce too much stain, in small windows especially, nor have it too powerful, or the result will be a disagreeable saffron tint to the whole subject, throwing an unpleasant light into the apartment, which will have quite a jaundiced hue. Avoid also getting it too flat; at the same time do not have its flatness broken by streaks; and, within certain degrees, keep it varied in fulness.

There is another thing very necessary to be known, —and that is, never apply stain to any but a clean surface; it must never under any circumstances be laid on the painting colour, or the result will be that it will appear muddy, and the work will be spoiled.

Stain requires grinding well in tar on a slab, scraping up, and putting aside into any vessel kept free from dust, as a stock for future use. Before using, stir up the contents to an even consistence, and simply put it on the back of that portion of the painted work which is desired to be yellow, to about the thickness of a sixpence, making sure it does not go beyond the part intended; if it does, remove the superfluous portion with a pointed stick, or the point of a knife.

In the process of staining glass, the material with which the stain is mixed should, after firing, be scraped or brushed off the glass; it may then be used again for the same purpose, as some portion of stain will be left in it.

It may sometimes be of advantage to obtain effects by staining flashed glasses. This can be done by staining the unflashed side; thus, by covering the white side of a ruby sheet with a stain, we can obtain a fiery red, or by staining the unflashed side of a sheet of blue, we can obtain a green.

Firing.—It will be desirable to practise for some time further both tracing and painting, before submitting work to the process of firing; both on account of the waste of glass involved in firing that which would scarcely bear the ordeal of criticism, and on account of the expense of firing itself. The amateur will do well to entrust his work when painted to the hands of those who place their kilns at the service of such as do not possess them. These kilns are kept continually going, so that the charge, comparatively speaking, is but a mere trifle.

For the information of amateurs, it may be well briefly to describe the glass kilns and the mode of firing them.

There are two kinds of kilns—the closed and the open. The closed kiln consists of a box—termed a muffle—of cast iron, so set in brickwork as, when closed, to enable the flames to circulate around it. The fire-hole is below this box, and a system of dampers is so arranged in the flues as to regulate the direction of the heat.

Cast on the inner sides of this box are ledges, for the reception of the plates on which the glass is laid and upon which they slide.

The *modus operandi* of firing is as follows:—

Heat either whiting, plaster of Paris, or lime to redness in a furnace; and, when cold, by means of a fine sieve put a smooth layer upon the surface of the plate; upon this plate the pieces of glass which have been painted and thoroughly dried are placed close together, but not allowed to touch each other, care being taken to allow a space of an inch all round the plate itself. Should this not be done, and a large piece come in too close contact with the edge, it is liable to crack or "buckle," as the heat is far greater at the sides of the plate than in the middle.

Proceed with the other plates until all the glass is in. Be careful not to cover any of the glass with whiting. The door of the kiln is now put in its place, and a luting of whiting so placed over the cracks as to prevent the admission of any sulphur from the fire. The front of the kiln is now bricked up, and the fire lighted.

The door has two arms projecting beyond the brickwork, which have openings in them; their object being to enable the attendant to watch the contents of the kiln without exposing himself to the flames or deleterious gases: these openings, in the early period of the firing, are allowed to remain; but as soon as the glass becomes thoroughly hot, they are closed by stoppers, which are removed only as occasion requires.

The great object is to obtain an even heat, so that the back, front, top, and bottom are equal. This, the dampers and the method of stoking assist in obtaining.

An expert kilnman sometimes depends upon his judgment as to the extent of the heat to be given to the glass; but what are termed "proofs" are generally used for the purpose. These are strips of glass, laid on pieces of tile in such a manner that they will bend when the kiln is sufficiently heated; and thus give notice to the person in charge, who, by means of the openings already described, can see the entire contents.

The firing completed, the fire is drawn, and the kiln, which takes five hours and upwards to heat, is allowed to cool. This gentle cooling anneals the glass; after which it is removed and carefully wiped, and those parts which require retouching having been put on one side, the remainder is ready for the glazier.

When putting glass in a *closed* kiln, the painter should endeavour to put that which is hard on the top and bottom plates, as the heat on them is much greater than on those in the middle of the kiln; and of course, soft glasses should be placed on the cooler plates.

The open kiln differs from the closed in this particular—that, whereas the latter requires luting up at each time of using, the former requires no luting whatever. The flames in this case circulate only at the sides, top, and back.

The fire lighted, the kiln is allowed to get to almost a white heat; and the plates, upon each of which a single layer of glass only is placed, are introduced. The door is then closed, and, after a quarter of an

hour or twenty minutes is again opened, and the plates turned, to enable the front ends (which have not received so great a firing as the back) to get the requisite heat.

The glass being now properly fired, the plate is taken out and put in a box, somewhat similar to the kiln itself, where it is allowed to remain until it is cool, in order to anneal the glass.

One drawback attending the use of the open kiln is, that large pieces of glass, when put suddenly in it, are apt to break, and the same is likely to occur on taking them out; but for firing small work it is very convenient.

The amateur must be careful in firing work not to overheat it, as such a course would burn off the colour in some degree, and perhaps would injure the glass so much as completely to spoil it. He must also remember that different kinds of glass vary in their power of resisting heat. The glass painter gives the name of hard or soft to glass according to this power, and he cannot tell by the mere appearance of the glass whether it is the one or the other; therefore trials should be made.

As a rule all white glasses are hard; greens, yellows, and purples, soft; but this rule is not invariable.

In firing stain, do not go beyond the necessary heat, as stain is apt to become deposited on the glass in a dirty opaque manner, and cannot be removed without the aid of hydrofluoric acid—a fluid which injures the glass and destroys its brilliancy.

Glazing.—There is another operation necessary

for the glass to undergo before it is in a condition to be fixed in its proper place; but it is the purely mechanical one of glazing. The work is first laid out upon the cutting drawing, and then joined together by grooved leads, which surround the pieces of glass, and the joints are afterwards soldered. This being done, the interstices between the leads and the glass are filled up with putty, or a cement composed of white lead and oil; and after lying by for a day or two, the glass is fixed in its position.

Special Processes.

DIAPERING.—Diapers are often used for the purpose of giving richness to the work, either as ornamentation on portions of the drapery, or as backgrounds for the figures.

There are two ways of introducing them—either in the form of a traced pattern, or in what is called a "*sticked*" diaper: the former is effected by placing the design under the piece of glass on which the main outlines of the drapery, etc., have been painted, and tracing the pattern with the pencil in the ordinary way; and the latter, by covering the piece of glass with a coating of mat, and picking the pattern out with a hard stick.

Again, there are two styles of diapers: the flowing pattern, and the set pattern. The flowing diaper is foliated; and the set pattern, one in which the various designs are repeated. The same pattern must not be allowed to occur on more than one of the draperies in the same subject; nor must the same style of diaper be repeated in it. For instance, —a figure, the drapery of which has a running

diaper, should be set off with a background having a set diaper.

Inscriptions.—It is sometimes required to have an inscription in a stained glass window, either as a label running under the subject, which label usually refers to the subject illustrated, or as a memorial inscription at the bottom of the window, setting forth for what purpose, and by whom, the window was erected.

There are two methods of writing these inscriptions: one is by tracing a black letter on a plain ground, and the other by picking out of a solid mat a clear letter on a black ground.

When the latter is to be done, the colour must be mixed with but little gum, and an even coat laid upon the glass with a flat camel hair and badger brush. The letters are then to be sketched in with a soft pencil, and picked out with a stick.

Heraldic Work.—Heraldry is one of the best branches of glass painting; and to execute it well requires a certain knowledge of that art itself.

In written descriptions of the shield or coat of arms to be painted—

Gules	signifies	red.
Azure	„	blue.
Or	„	yellow
Purpure	„	purple
Vert	„	green.
Sable	„	black.
Argent	„	white.

In painting, put on no line or ornament save that which is represented on the shield itself; as by adding to it in any way it is made incorrect.

The only latitude that is allowed to the glass painter is in the way of diapering. Diapers can be put on the "field," as it is called, provided they are not allowed to appear too prominent.

Should the shield to be copied neither have the colours indicated, nor their names written beneath, as is sometimes the case in engravings, it will be found on looking closely at it that there are certain lines or marks on it varying in their direction. These lines indicate the colours. For instance, lines perpendicular in their direction signify red; horizontal lines, blue; lines running diagonally from the left of the shield to the right, represent purple; those running the same from the right to the left, green; perpendicular lines with horizontal lines crossing, represent black; absence of colour, white; and black dots on a white ground, yellow.

In heraldry, Or (yellow) and Argent (white) represent the metals gold and silver; and it is the rule in English heraldry for metal not to lie upon metal, nor colour upon colour. Thus, if the field be argent or silver, the charge could not be gold or silver, but must be a colour. There are deviations from this rule, but they are few in number.

Heraldic painting on glass is very effective, in consequence of the richness of the colours; and nothing is more suitable for a hall or corridor window, especially when coloured shields are disposed upon white

Figure and drapery from Lincoln Cathedral, showing details of border and grisaille of the earlier half of the thirteenth century.

grounds, as then we have richness of effect without any material diminution of light.

In diapering that portion of the shield coloured sable, lay the glass with a solid coat of colour, and pick out the diaper with the point of a needle, and then lay a slight mat over the back, as by this means the glass will convey the idea of being black, without being so in reality.

Giving a Tone to Glass.—It may sometimes be desired to give a tone to glass, without putting any pattern whatever upon it; or it may be that work which is already traced and painted is not sufficiently dark: under these circumstances the glass can be matted on the cut side, or on the reverse side if it be painted, and then rubbed with the finger in a circular direction—when the colour will, if the matting colour has its right proportion of gum, come off in parts, and leave a scum on the surface of the glass, giving the depth of tone required.

Stencilling.—A great deal of common modern work is cheaply executed, by laying flat coats of enamel colour on sheets of glass, and brushing out various patterns from a stencil with a moderately hard brush, and afterwards firing them; there is, however, no skill required to accomplish it—the only branch in which art intervenes being the designing of the pattern.

In cutting stencils, tinfoil is used; the only tools required being a sharp penknife or engraving tool, and an accurate pair of steel dividers.

Lace Glass.—A few years ago a great trade was done in what is called lace glass—a style of work

bearing a certain resemblance to lace, which was effected by cutting small patterns out of paper and attaching them to pieces of muslin. These pieces of muslin were afterwards stretched over the pieces of glass intended to be ornamented, and a finely powdered enamel allowed to settle on it.

Use of Fluoric Acid.—Hydrofluoric acid possesses the property of decomposing glass. For instance, suppose white jewels are required on a ruby dress, or a white crown required to have ruby jewels,—it can easily be done by means of this powerful acid. At one time it was customary to warm the piece of glass on which the jewel or pattern was to be taken out, and then to coat it with a thin layer of wax, out of which the pattern was picked with a stick; the acid was afterwards poured on it, and the parts not covered with the wax were found corroded with the acid. In the present practice it is found that Brunswick or Japan black is far preferable, on account of its being less liable to peel or come off when under acid, and of its allowing of a greater rapidity of working. It is applied in the ordinary way of tracing on the flashed side of the glass.

After it is thoroughly dry, an edging of Russian tallow is placed round it, and the acid poured on to the thickness of half an inch. When a sufficient time has elapsed, pour away the acid; carefully avoiding contact with the fingers or clothes. The Brunswick black is afterwards cleaned off with common paraffin, or spirit of turpentine. To give some idea of the various effects that can be obtained on one sheet of

glass by a combination of the process of embossing, staining, and painting,—a landscape can be nicely managed on a sheet of blue, by taking out with acid that part intended to represent water, buildings, etc., leaving the ground and sky nicely graduated; now by staining the trees and the foreground the reverse side of the glass, various shades of green are obtained, after which the work is painted in the ordinary manner.

The common embossed work ordinarily used for the ornamentation of plate glass, for shop fronts, etc., is executed with this acid. The pattern is either traced, or else the plate is laid with an even coating of the colour. This, when dry, has a stencil of tin-foil, or thin sheet brass, out of which the pattern has been cut, laid on it; and the pattern is then brushed out with a stiff brush moistened with paraffin spirit. The back of the stencil is frequently soaped, to prevent it adhering to the colour. After the pattern is brushed out, the edging of tallow is applied, and the acid is put on; and the plate being corroded to a sufficient depth, the tallow is scraped off and put aside for future use; and the glass being thoroughly clean, is ground with emery.

As hydrofluoric acid affects glass so powerfully, it must be kept in a gutta percha bottle.

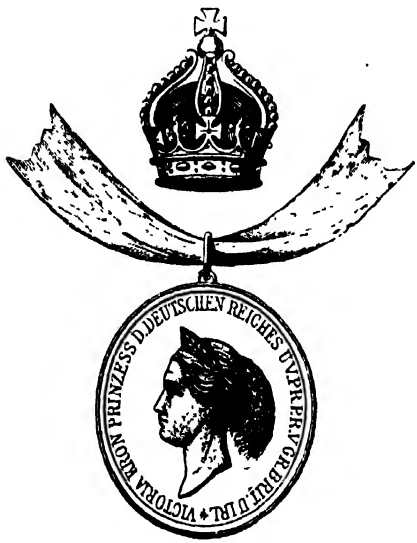
Those who are desirous of learning more concerning this branch are recommended to procure a work on the subject published by Messrs. Brodie & Middleton, which has already reached the twenty-sixth edition. The work is of very great value, and

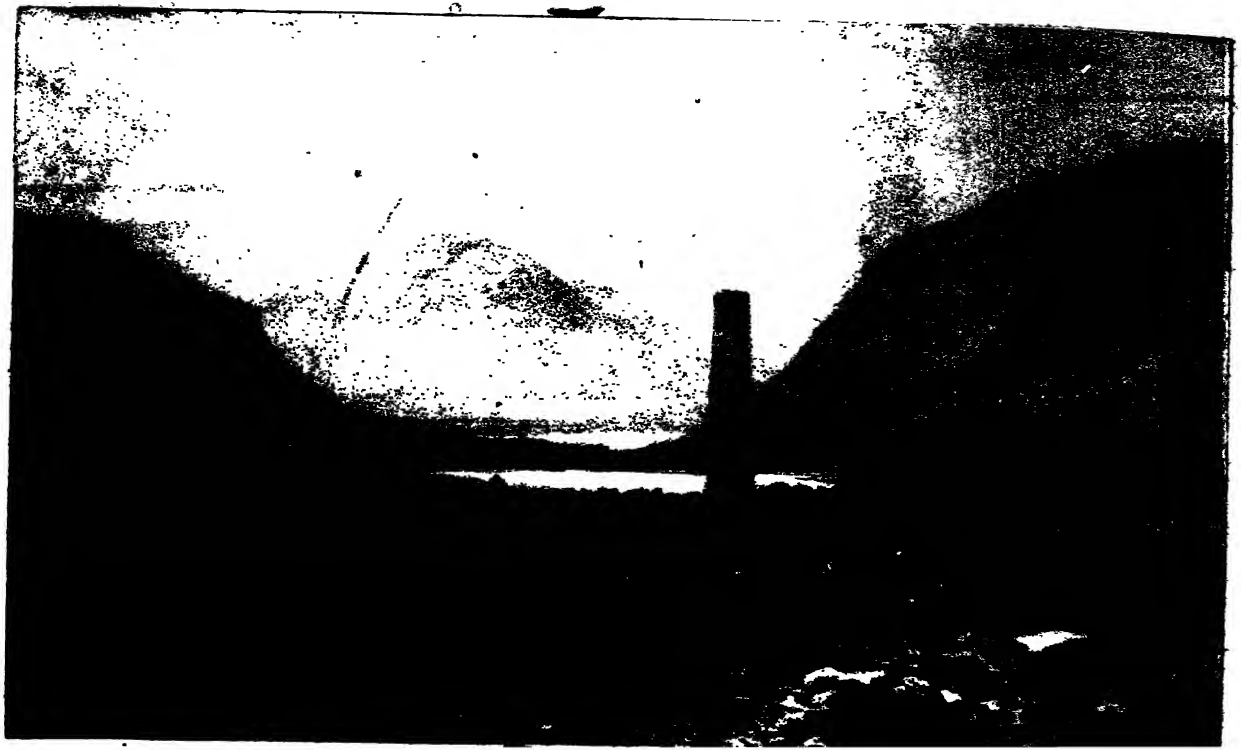
contains not only instructions in the art of embossing, but a variety of information of general use.

The remainder that needs to be dealt with is mainly a matter of those mechanical processes which have been fully described in simple practice. It is unnecessary to recapitulate the hints on colours and their harmonious arrangements which have been already given in the ceramic portion of this work. The student will save himself from many disappointments if he will bear in mind the limitations of the art, and not attempt to produce effects on glass which are not suitable for that special class of work. Glass painting is not the production of transparent pictures; and if the student attempts to paint them by a lavish use of enamel colours, the result will be painted transparencies instead of stained glass designs. A striking instance of this kind of failure was recently to be seen in the Guildhall of the city of London, where a window containing a series of panelled landscapes, which had been put up by an error of judgment, had to be removed to give way to one with broader treatment. Mere prettiness should be expressly avoided, as also should all detail which will not conduce to the general effect of the window or other work when placed in the position which it is to occupy. The primary object of a window being to admit light, the painting or staining should only be sufficient to soften the light, and not so heavy as to block it out, except it is the desire of the painter. Some windows are so heavily painted that they would need a special dark room for their

display, like the Oriental courts at the Crystal Palace. The *desiderata* in a well executed work in stained or painted glass are good design, bold firm outline, harmonious arrangement of colour, and judicious shading and general treatment, thus blending the whole into a perfect work of art.

The reader is indebted to Mr. Westlake for the sketches and descriptions which accompany the letter-press on glass.





APPENDIX.

POTTERY AND PORCELAIN.

Palissy Dish: Kensington Museum.

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POTTERY AND PORCELAIN.

IT is not possible to say when the manufacture of pottery first began. Clay is a material so generally to be found, and its plastic nature so easily discovered, that the art of working it does not exceed the intelligence of the rudest savage. As now among the most barbarous tribes earthenware utensils of various kinds are commonly in use, so we find at least fragments of pottery in the graves and ruined habitations of prehistoric people.

The first attempts to make vessels which would hold liquids reached no further than to those which could be made sufficiently hard by exposure to the sun. Such objects of sun-dried clay would be of a very perishable nature and could scarcely, except in the most dry climates, survive through a single winter. Egypt, Assyria, and Babylonia have transmitted to our days many sun-dried examples which represent very early efforts of the art. The baking of the clay, so as to produce an indestructible tenacity, must have been an immense stride; and was probably discovered by accident rather than design.

Although sun-dried vessels may be made of clay alone, yet in baking it undergoes a great alteration on account of its contractility by heat, and some siliceous substance incapable of contraction must enter into the body of the pottery. If we take a mere lump of clay soaked in water sufficiently to render it plastic, and fashion it into a bowl or brick and lay it in the sun to dry, the object hardens as the moisture evaporates and the particles adhere slightly together. We have thus obtained, however, only a brick or vessel of desiccated clay which may be again converted into its original state, by adding the lost quantity of water. But if the object be placed in a kiln, the nature of the clay is completely

altered; the high temperature melts all the parts and cements them, effecting a chemical change; so great that water can never mix with the substance again, so as to form clay. Then also the contraction takes place, of which we have just spoken.

Even among the most ancient pieces or fragments of pottery which have been discovered we find specimens roughly and rudely ornamented. Whilst the clay was soft it was easy and natural to make marks and lines upon it, at first with the finger, afterwards with the finer point of the nail or a piece of horn or wood. As time went on, and men spread over the earth and assembled into tribes or nations, peculiar methods of mixing the clays and conventional forms and ornaments would be manifested by each. These have enabled us in modern days to trace many of the primitive vessels to their source, and appropriate them to their true makers with some degree of certainty.

We know that bricks were made in Egypt from the very earliest period of her history: and being often impressed with hieroglyphs they have served as historical records and have transmitted to us the names of a series of kings. Somewhat later, among the Assyrians little tablets and cylinders of terra cotta were employed for writing upon, and were used for their public archives, their operations of trade, and historical annals. Some of these cylinders and other relics, still extant, contain the history of Tiglath Pileser and the campaign of Sennacherib against the Jews. To this indestructible material we are indebted for a detailed account of many important facts in the Assyrian history; whilst some of the decades of Livy and the plays of Menander, written upon more perishable stuff, have been wholly lost.

The potter's wheel was an early invention and a vast improvement upon the methods previously adopted in fashioning the sun-dried clay by the hand alone. These could have produced only vessels of a very rude and unsymmetrical shape. But the application of a circular table or lathe, laid horizontally and revolving on a central pivot, on which the clay was placed and to

which it adhered, was a truly wonderful advance in the art. As the wheel spun round all combinations of oval, spherical, and cylindrical forms could be arrived at, and vases became not merely symmetrical in their proportions but true in their capacity.

The invention of the wheel has been ascribed to all the great nations of antiquity. It is represented in the Egyptian sculptures, it is mentioned in the Scriptures, and was in use from a remote period in Assyria. The oldest vases of Greece, some of which have been attributed to the heroic ages, bear marks of having been turned upon the wheel.

Greek vase, signed by Nicosthenes.

The next step was to render the clay vessels less porous and better fitted to hold liquids by covering them with an impervious glaze. Opaque glasses or enamels as old as the time of Moses have been found in Egypt. The employment of copper to obtain a brilliant blue enamel was very early both in Assyria and Babylonia; and the use of tin for a white enamel, as recently found in the enamelled bricks and vases of those ancient countries, anticipated by many centuries the rediscovery of that process in Europe in the fifteenth century and shows the early application of metallic oxides.

Pottery is either soft or hard. The terms have reference to the composition as well as to the degree of heat to which it is exposed in the furnace. Thus, common brick is soft; fire-brick

hard. Common earthenware vessels are soft; crockery, such as stone ware, is hard. Porcelain is also distinguished by the technical terms "soft" and "hard paste," the softness being determined by the greater proportion of silex.

Porcelain is composed of two substances; the one fusible which produces its transparency, the other infusible. The best practical test to distinguish the two descriptions is that the body of the soft paste can be scratched with a knife, which is not the case with hard paste. The ancient pottery of Egypt, Greece, and Rome was soft; whether glazed, unglazed, or lustrous. In our own days oriental porcelain may be taken as a type of hard, and early Sèvres or Chelsea of soft paste manufacture.

The body of hard porcelain is formed of "kaolin;" which is a natural decomposition of granite. Used alone kaolin would be opaque; but by the mixture of a perfectly transparent and highly refractive substance it is rendered capable of transmitting light, as paper is made translucent with oil. This refractive agent is "petunse" or china-stone; containing much unchanged felspar, which also supplies the principal material for the glaze.

Examples of Egyptian pottery are to be found in most of the great collections and in national museums. Pottery was not only an important branch of the domestic arts of Egypt, but was largely employed for making vases to hold portions of the dead bodies which were to be embalmed. For daily use they had vessels of various shapes and sizes; some as large as several feet high; some scarcely an inch. These were used not alone for liquids but for bread and meat, for ointments, drugs, and sweetmeats. Besides existing specimens which have been found in tombs, paintings have been discovered showing the potters at their work. A scene upon a wall at Beni Hassan represents the kneading of the clay, rolling out the paste, placing it on the wheel and fashioning it with the hands. The Egyptians knew also how to make a ware which appears to correspond with modern porcelain. Strictly this was not porcelain, not being translucent nor so com-

pact. The colours, green, red, yellow, or violet, are all good; but the best was a fine celestial blue, probably obtained from an oxide of copper, which has been scarcely rivalled after three thousand years of later human experience. Amulets, rings, little vases, the decorations of mummy cases, bottles, beads, and the like, were made of this material. Of a larger size, the chief objects were sepulchral figures, covered with hieroglyphs, to be placed in the tombs.

We have already spoken of the cylinders and tablets used for writing on by the Assyrians; and everywhere in the ruins of Babylonia fragments of glazed ware have been found. The most numerous and the least imperfect are the coffins made of this kind of ware. They are shaped like a slipper with a large oval aperture above, through which the body was introduced and then closed in with a lid of earthenware.

A few vases and large quantities of broken pieces of earthen vessels have been found on the sites of some of the cities of Judæa; at Jerusalem, Bethlehem, and elsewhere. The Hebrew potters do not seem to have been distinguished in the art, and there are comparatively few notices of it in the scriptures; but there was a guild of potters at Jerusalem and one of the gates of the city was named after them.

Passing from these old oriental nations we find the greatest excellence among the Greeks. The beauty and simplicity of the forms of their vases have caused them to be regarded as models; and by the addition of painting they have become an almost inexhaustible source for illustrating the mythology, the history, and the customs of the people.

The term now commonly in use for the potter's art, namely, ceramic or keramic, is from the Greek *Keramos*, supposed to have been derived from *Keras*, a horn, probably the primitive material from which drinking vessels were made.

The use of terra cotta among the Greeks was very extensive. It was employed in buildings for roof and drain tiles, columns,

and other architectural members. Statues were made of it for the temples, small decorations of various kinds for personal wear, and ornaments for houses; besides, of course, vases and culinary and domestic utensils, and lamps. Numerous examples of all these classes may be seen in most of the great national collections at home and abroad: the chief of them and the most beautiful are the vases.

Terra cotta (as its name imports) is simply baked clay; but much skill and care are necessary in its composition, so as to ensure the right degree of hardness. The principal material is common potter's clay, with which a certain quantity of broken earthenware is mixed: these being finely kneaded together are moulded into the required forms, which are placed in the kiln. When properly burnt, terra cotta is harder and more endurable than natural stones.

The terra cotta vases of the ancients are of various shapes; and many of them, intended for ornamental purposes, are covered with a white coating and painted with colours; a few simple ornaments, or plain bands, or chequered wreaths. But there was another kind of vase, made of a paste composed of a substance very similar to terra cotta, yet deeper in tone and more tender in its texture. This last, however, varies; being sometimes so hard as scarcely to admit of a cut with a knife; sometimes so soft as to be easily scratched with a finger-nail. These vases show, at their best period, the highest point of perfection which the ancient potteries attained. They are painted with various colours, chiefly black, brown, yellow and red, covered with a thin alkaline glaze, which is transparent and enhances the colours like the varnish of a picture. They are so porous that water will ooze through them, and the paste when struck gives a dull metallic sound.

Vases of this description have been found not only in Greece but in such large quantities in Etruria that the name Etruscan has been long and very commonly given to them. The discoveries in

Etruria and Campania are the work of Greek artists, and the style of painting as well as the designs completely Greek. The Etruscans were accustomed to inscribe their own art productions with the peculiar characters of the nation; but it is believed that no good painted vase has yet been found with any other than a Greek inscription. The number of vases which have been found—it need scarcely be said, all, with very few exceptions, in the old graves and larger tombs — seems incredible: probably the total in public and private collections exceeds 40,000. There are about 5000 in the British museum, 1500 at Paris, and nearly 2000 at Berlin.

Etruscan vase.

We have no means of ascertaining the date of the oldest glazed vases without inscriptions. Some may reach as far back as nine or ten centuries before our æra, and they come down to as late a period as the second century after Christ. More than one attempt has been made to classify them, but all are somewhat arbitrary.

Very briefly it may be said that the archaic period ended about 700 B.C. and many of the first examples were made with the hand. They are rude also in the painted decorations. For a century or two the style of art continued to be severe, but with increasing skill both in design and execution. The figures are in black on a red ground, and the outlines usually engraved with a point; the subjects being heroic and mythological. The best period succeeded, and extends from the sixth to the fourth century before Christ.

In looking at the admirable productions of this age we must

remember that the drawings were executed upon the moist clay, so that great freedom of touch and unhesitating decision were required; for no mark once made could be obliterated, and a complete and perfect line was to be traced without taking the brush from the surface. The vases were painted in an upright position, and the eye of the artist was his only guide. Notwithstanding all the difficulties the ancients observed the laws of equilibrium in their figures; conveyed expression by means of attitude; and by the use of profile and the introduction of small objects into the background compensated for the want of perspective.

The instruments employed by the Greek potters must have been like those in use at the present day. The apparent fineness of the exterior is solely due to the care with which the surface was polished. The paintings were made with a kind of brush, a stick being used to steady the hand. The outlines were formed with a pointed tool, and the incised circular lines in shields apparently with a compass.

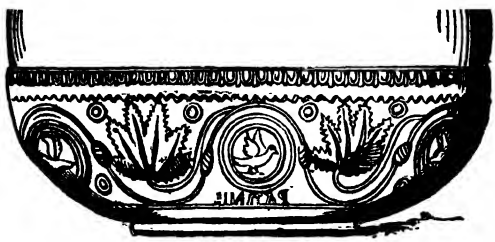
From the fourth century B.C. to the second of the Christian æra a gradual decline is to be traced in the Greek vases; to be observed in an exaggeration of the proportions and in superabundance of ornamentation. About the year 200 the making of them altogether ceased.

From the very earliest times the island of Samos was renowned for its fictile ware; and the oldest description of the potter's art in literature is in one of the Homeric hymns addressed to the Samian potters. This ware—the famous so called Samian ware—retained its renown till the days

Fragment of Samian ware, found in France.

of the Roman empire: and evidence of Roman occupation may almost always be shown in excavations by the discovery of some fragments. The most remarkable fact connected with this ware is not only its uniform density and texture but its colour, a beautiful coralline red. As it is difficult to comprehend how this should be the same everywhere—whether in Germany, France, or England,—however distant the localities may be and the difference of soil in each, we can but refer to one district as the place of its manufacture: or, at any rate, from whence the clay was supplied for making it in some few Roman towns in western Europe. We know, moreover, that Pliny expressly says that the Samian ware was exported not only to Rome but "to every nation under heaven."

The general forms of the Samian ware are bowls and dishes of considerable thickness, as if intended to bear constant wear and frequent removal. The ornamentation is peculiar and cha-



Samian bowl.

racteristic; moulded in relief upon the exterior, the interior having been first rounded smoothly into a perfect form by the lathe. Some of the patterns are beautiful; and a few among them are valuable as illustrating gladiatorial combats and Roman games and customs. The scrolls, most usual as an ornament, are exceedingly elegant; generally varieties of the tendrils, flowers, leaves, and fruit of the ivy or the vine. Repetition was greatly sought; and, as in the general decline of any

art, the ornaments occupy much space in proportion to the surface.

Very numerous examples of Roman pottery (and their potteries were spread everywhere) are to be studied in museums; chiefly, urns and lamps, culinary vessels, cups for drinking, and large amphoræ. The lamps are beautifully decorated with elaborate subjects in relief: from the fables of Æsop, the legends of Rome, or love-scenes and the like. One of the finest is in the British musuem; a race of four-horsed chariots, in the amphitheatre: and another, very remarkable; in which the bowl has in relief a copy of the seven-branched golden candlestick of the temple of Jerusalem.

In excavations and in graves in most of the northern and western countries of Europe fragments of very ancient pottery often occur; and not seldom also complete pieces. It is not necessary to do much more than refer to the fact. The vases of the Stone period found in tumuli are generally of an urn shape with wide open mouths, and tapering at the feet. They are so friable that they could scarcely have been made for domestic use but, probably, for sepulchral rites. The ornament is of the simplest kind; cords or bands; and made with coarse instruments. They are not turned with the wheel but fashioned by the hand. So, also, in much later ages, down to the British and Romano-British times, we find only a gradual, and very slow and slight, improvement. In short, the

Ancient Gallic vase.

Ancient British bowl.

early pottery of the nations which inhabited northern and western Europe was of the lowest order with respect to those qualities which we esteem in the potter's art.

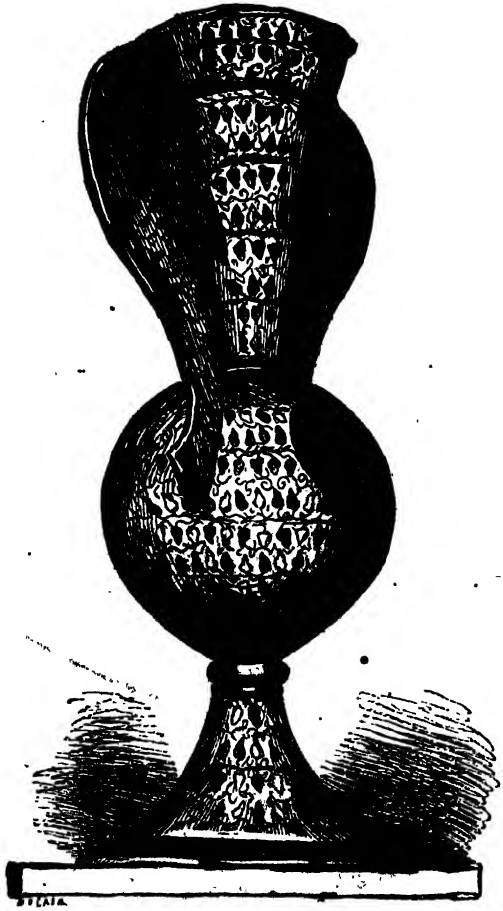
With the fall of the Roman empire all the arts declined; and some of them to so great an extent that for a long time they may be said to have been almost extinct. Probably no branch suffered so much as the art of pottery. The process of the

Mediæval jars and basin.

lustrous glazing seems to have been lost before the third century began, and we may say that for a thousand years we have no examples left—with one exception—which we might call artistic. That exception, the Hispano-moresque, will be spoken of more fully in another section, on Maiolica.

When Theophilus wrote in the 12th century, and explained the various industries of the nations of Europe, he mentions only the pottery of the Greeks. He speaks of a process which they used to decorate their pottery, by means of vitrifiable colours

(true enamels) and with gold and silver applied with the brush. But we know nothing of the nature of the clay, nor whether it



Hispano-moresque vase.

was glazed. Neither is there, we believe, in any museum or collection a single specimen which can be referred to. We must not, however, omit to notice that some very admirable busts

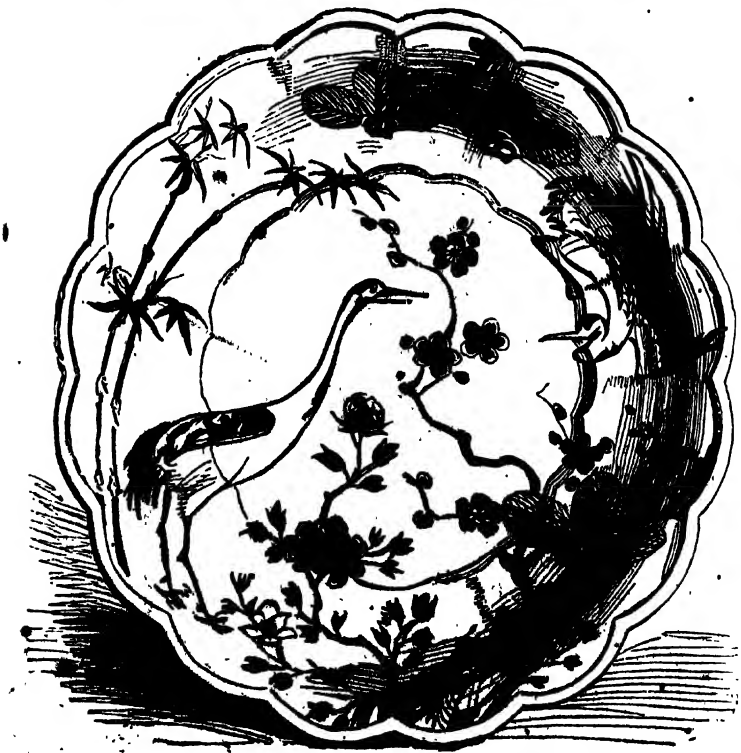
and statuettes were executed in the north of Italy about the middle of the fifteenth century.

Terra cotta; Florentine; fifteenth century.

In France many towns became well known as centres of the manufacture of pottery, about the beginning of the fifteenth century. In inventories of that date specimens are described of

Pilgrim's bottle: Nevers.

Beauvais ware, which were so highly esteemed as to be mounted in silver. It is necessary to name only one other place, Nevers, where enamelled pottery was first made in France under the patronage of Catherine of Medicis. This manufactory has continued down to the present time. The Nevers ware of the best period (the beginning of the seventeenth century) is very beautiful, and there is a large collection in the museum of that town. Although sometimes an imitation of the Italian mai-



Dish: Rouen.

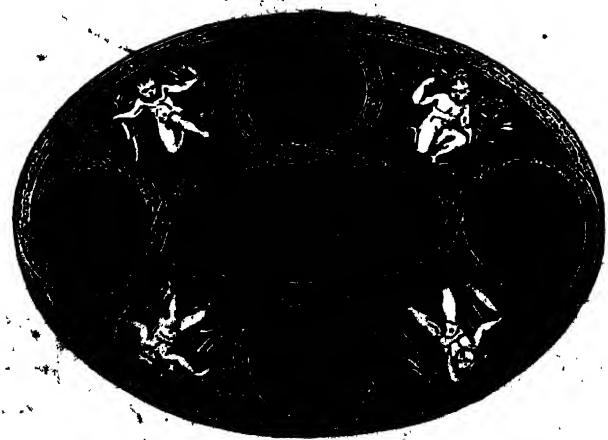
olica it yet differs from this in many respects. The outlines of the figures in such specimens are traced in violet, the flesh is yellow: a copper-green is a peculiarity, and red is seldom used. Blue and yellow are the predominating colours, separated by a line of white. About the same period, good pieces were also made at Rouen. These are sometimes of a large size, fountains, vases, busts, etc., and are of a later date. Moustiers, in

Rouen vase.

the south of France, also produced some fine pottery, and succeeded in reaching a high degree of refinement. Examples are very rare.

The two most famous wares of France, of the time of the renaissance, are the Palissy and the Henri Deux. Bernard Palissy was born about 1510, of poor parents, who could give him but little education. He learned to read and write, and

Moustiers dish.



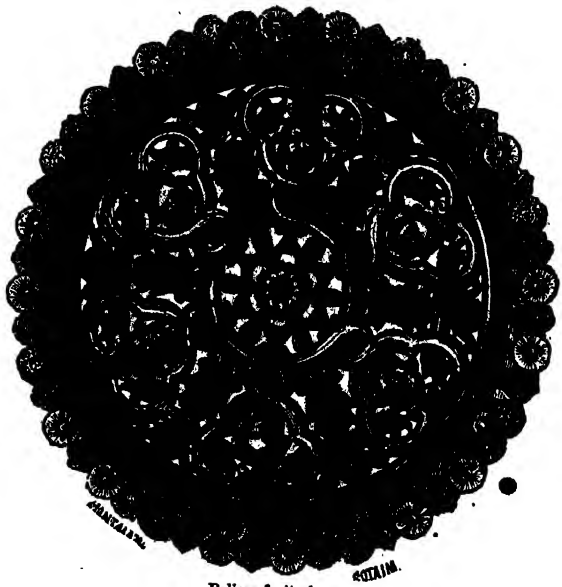
Palissy dish : Kensington museum.

taught himself geometry, drawing, and modelling. Beginning as a workman in glass, having made himself master of that business, he travelled and studied natural history and chemistry. A few years after his marriage in 1539 he saw a cup of enamelled pottery, and it struck him that if he could discover the com-

Salt cellar; Palissy: Kensington museum.

position of the enamel he would raise the art of pottery to an eminence hitherto unknown and secure his own fortune. He knew nothing of the process or of the materials: but he made experiment after experiment, and spent all his money in useless attempts. He has described, in his own book, his labours, his trials and disappointments. He would yield to no complaints of his wife or the arguments of friends; once, when no more money could be borrowed, he burned the tables and boards of his house for fuel to supply his furnace. At length he was successful: he discovered the secret of the enamel, and his pottery soon obtained him wealth and fame.

The fayence of Palissy is characterised by a peculiar style and many peculiar qualities. It is not decorated with flat painting. His figures and his ornaments are all executed in coloured relief. The back of his pieces is never of an uniform colour, but mottled with blue, yellow, and brown. The natural objects which he modelled are very true in form and colour: he

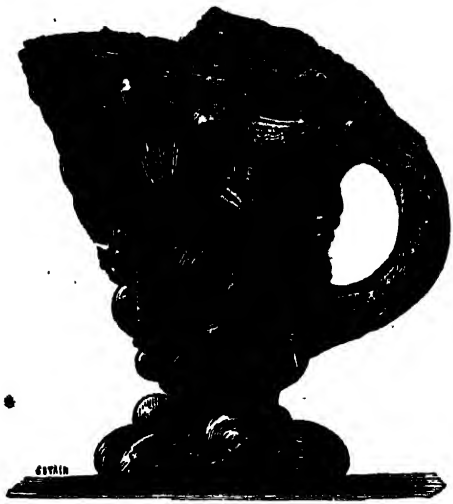


Palissy fruit plate,

placed upon his dishes fish, reptiles, and plants carefully formed,

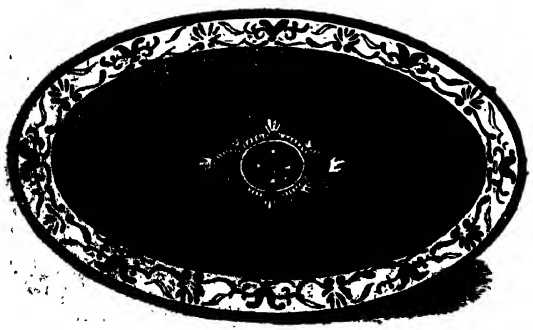
Reptile dish; Palissy.

probably, from living specimens. Sometimes fossil shells, so correctly that their species can be recognised. These "rustic



Palissy cup: with shells.

pieces," as he himself named them, were not made for use but only for ornament. He made also vases with elaborate decorations, salt-cellars, inkstands, dishes, ewers and statuettes. It is right to



Palissy dish.

say that some doubt exists as to the statuettes: and the famous "Nurse" and the "Girl with the puppies" are possibly by some other hand. The costumes seem to be a little later than Palissy's time.

Palissy mould.

Some few years ago, in digging a trench in Paris, traces of the workshop of Palissy were discovered; with fragments of his pottery and some moulds intended to be used: these are in high relief, portions of the human figure.

Imitations of Palissy's work were made after his death; those attempted in modern days can rarely be mistaken for the true ware: they are overloaded with ornament. Even under his immediate successors, some perhaps who had worked under him, the art greatly deteriorated. The talent and the taste of the inventor disappeared; and we have monotonous repetitions. The care displayed in the manufacture of the true pieces, the sharpness of the relievo decorations, the purity of the tint, and the brilliancy of the enamel colours, are tests by which they may be distinguished from later productions of the same kind. Very large collections of Palissy ware and admirable examples are in the Paris museums and at Sèvres: there are good specimens also in the British museum and at South Kensington.

Genuine pieces of Palissy ware have become very rare;

naturally it would be so, when so many have been procured for and are shut up in national collections. At the Pourtalès sale in 1865, a reptile dish sold for £28; a recumbent female for £112; another dish, £40; and a square salt-cellar for £202.

The so-called Henri Deux ware, now more properly described as Oiron ware, is unique of its kind: and until lately nothing was known with certainty either as to its producer or the place of its origin. Some have thought it to be Italian work: but it differs too essentially from the Italian maiolica to admit of this conjecture. No specimen has yet been found in that country: and the majority of the pieces have been brought from Touraine and La Vendée. Within the last few years, a large amount of evidence has been brought forward, we may almost say conclusive, that they were made at Oiron in Poitou. We have sufficient evidence as to the date of the manufacture. Upon some of the earlier pieces are emblems of Francis the first; and on a greater number we see the device of Henry the second with the crescents interlaced, said to refer to Diana of Poitiers.

The paste used for modelling this ware is a true pipeclay, fine and very white; so that it does not require, like the Italian fayence, to be concealed by a coating of opaque enamel: the decorations are merely glazed with a very thin varnish, yellowish, and transparent. These decorations consist of initial letters, interlacings, and arabesques impressed upon the paste, and the

Ewer; Oiron ware.

cavities filled in with coloured pastes, so as to present a smooth surface of the finest inlaying, like the damascening of metal work. The ornaments, which are drawn with wonderful clearness and precision, are not traced with a brush (as might be at first sight supposed) but are engraved in the paste, and the colouring substances have been then incrusted in the depressions so as to leave no inequalities upon the surface. After the completion of this operation the object was baked and then glazed. These (as it were) inlaid ornaments appear to have been produced by the tools used by bookbinders, or even in some cases by stamps; and the patterns undoubtedly bear a resemblance to the book-binding of Grolier and Maioli.

Candlestick; Oiron ware.

In addition to these elegant niello-like decorations, the Oiron ware is enriched with raised ornaments in bold relief; masks, escutcheons, shells, wreaths, etc. The forms are always pure in outline and in the style of the renaissance; so that this exquisite pottery may be justly compared with the chased and damascened metal work of the sixteenth century.

The very high money value of this admirable class of earthenware has arisen from several causes; but especially from its

intrinsic artistic merit. Whilst displaying great variety in their forms and details the pieces are all conceived in the same general style, typical of a well-known and brilliant epoch, and in the highest degree personal and local. In fact, there can be no doubt that this famous pottery, as is the case with the Palissy ware, was the work or conception of one artist; perhaps by the hand, certainly under the patronage, of a woman, Héléne de Hangest-Genlis.

Oiron pottery.

At present about eighty pieces of Oiron or Henri Deux ware are supposed to exist; and none is a duplicate of another. Five of

these, a salver, a candlestick, a salt-cellar, and two tazzas are in the South Kensington museum. No other public collection in England can boast of one. Two are in the museum of the Louvre and one at the hôtel Cluny. The five pieces at South Kensington cost more than £1800; they would probably fetch now, if they could be sold, double the money. A "biberon" or drinking cup at a sale in Paris in 1865 was sold for £1100; and a small salt-cellar was bought privately about the same time for £700.

The celebrated productions of Sèvres are porcelain, not pottery. Other places had preceded Sèvres in the manufacture, especially St. Cloud: and about the year 1670 various attempts were made in France to imitate the Indian porcelain. The paste of the porcelain of St. Cloud is compact and milky in colour and the lead glaze vitreous and unequally laid on, so as to be apt to settle into drops. The decorations are often birds and flowers in relief, like the white oriental.

Very marvellous works in porcelain, especially flowers and bouquets, were made early in the seventeenth century at Vincennes; under the patronage of Louis the fifteenth. Once, when the king visited madame de Pompadour she took him into a hothouse where was a parterre, filled with roses, lilies and other flowers, and of delicate perfume. The king stooped to gather one, and had scarcely touched it before he discovered that they were Vincennes porcelain scented with volatilised essences.

Old Sèvres porcelain of the "pâte tendre" or soft body, is unquestionably the most beautiful and precious porcelain ever produced. The earliest dated specimen is 1753: and the manufacture of the true and highest quality (the soft paste) was discontinued about the year 1800 from various causes, the principal of which was doubtless the then general decline of taste in matters of art. The "pâte tendre" porcelain of Sèvres is a purely chemical composition, very soft and vitreous, and can be entirely swelled in the furnace at very high temperature, but the

hard porcelain cannot. The superadded glaze which covers it is also richer in texture than that of the inferior quality; it incorporates to a certain extent with the body, forming a more homogeneous and beautiful surface, and the enamel colours painted on it blend with it and assume the most lustrous hues. The painted decorations, indeed, of the old "pâte tendre" have an impasto like the best oil painting, and a depth and smoothness of tone, easily appreciable.

The more modern hard porcelain of Sèvres, even the splendid ware of the present day, is distinguished by very different qualities, and a slight examination shows its inferiority. Hard paste in comparison with soft has a crude and faded look; and the enamel colours rest upon the surface instead of mingling with or sinking into it.

Sèvres vase; bleu de roi.

Sèvres porcelain for domestic use had commonly a plain ground, painted with flowers detached or in wreaths. Pieces intended for decoration or for state dinner services had generally coloured grounds, such as the "bleu de roi" or "blue turquoise," or green, or especially the lovely rose pink to which the name of Dubarry is usually attached; although the colour had been invented some years before her appearance at court. Very skilful artists were employed upon the highest class, which is decorated with landscapes, flowers, birds and cupids, gracefully disposed in medallions of every variety of beautiful form. The portraits and miniatures are of a later date. Nor must we omit

to notice the jewelled cups of the best time; which, if genuine, are upon the bleu de roi ground. Sèvres produced also admirably modelled groups and single figures in biscuit, the models for which were supplied by Falconnet; one of the most famous is "the bather."

Sèvres porcelain has always been an extremely expensive production, and the cost of the pieces when first made bore a nearer proportion to their value, until within the last few years, than is generally supposed. The finest examples were made expressly for royalty or sold (by permission) for large sums. But lately the prices given for the rarest specimens, especially for sets of vases, has been increasing and seems to be enormous. In 1850 cups and saucers were thought to be extravagantly bought for £25 or £30 a piece; or bowls and dishes, for £60 or £70; or, again, when three oviform vases and covers, in Lord Pembroke's sale, fetched £1020. But at Mr. Bernal's sale a pair of rose Dubarry vases were sold for 1850 guineas; and cups and saucers for £100. The prices, however, still increased; and single plates have since been sold for £200, vases for 500 or 600 guineas each; and cups and saucers for 150 guineas. Can we say that the extreme has yet been arrived at, when we remember that a year ago a set of three jardinières fetched at Christie's, by auction, the enormous sum of £10,000?

With regard to the marks on Sèvres porcelain, all pieces are considered to have been painted before 1753 which have the crossed L s without a letter. At that date a letter of the alphabet, marking each year and beginning with A, was placed between the interlacing L s: thus, 1753 is indicated by A, and Z is reached in 1776. The following year is marked with a double A.

After the general introduction of Chinese porcelain into Europe by the Portuguese, chemists for two centuries endeavoured to imitate it, but could make no nearer approach than earthenware. The first European hard porcelain was made at Dresden by Böttcher, after numberless experiments and years of labour; and

the first manufactory was established at Weissen in 1715, under the patronage of Augustus II, elector of Saxony. Böttcher was appointed the director.

The earliest Böttcher ware is reddish brown and unglazed; stone ware rather than porcelain, and his first white porcelain pieces were ornamented with flowers in low relief. Unwearied as his efforts had been, chance and not science at last brought him the material which he wanted. A white soft earth had been introduced, ground into an impalpable dust, as a substitute for wheat flower for hair powder at that time in general use. Böttcher observed one day its unusual weight and inquired where the powder came from. He learned that it was earthy; he tried it; and found it to be the long sought for "kaolin," the substance which forms the principal basis of porcelain.

Improvements rapidly grew in the manufacture of Dresden china. At first the subjects painted were imitations of Chinese decoration; but these were soon succeeded by magnificent services with intricate gold borders, and medallions with flowers and other designs. Then followed vases and other objects with exquisite paintings upon richly coloured grounds, copies of the best pictures of the Flemish school, or birds and insects, flowers and animals. Modelled flowers and little statuettes, candlesticks, groups and single figures, are also among the most beautiful productions of

Dresden candelabrum.

the best period of Dresden china The quality greatly declined towards the end of the eighteenth century. The well-known Dresden mark, the crossed swords, was first used about the year 1722.

Dresden was not the only German city which became famous in the last century for porcelain: at Vienna, Berlin, Frankenthal, Furstenburg, and other places were very celebrated manufactories, but our space will not permit any separate account of them. The different qualities and marks are explained in many of the large works upon pottery.

Delft, a town between the Hague and Rotterdam, was celebrated for its wares at a very early period; which seem to have been imported into England as far back as the reign of Henry the fourth; and some "immense Delft ware dishes" were given by Philip of Austria, governor of the Netherlands, to Sir Thomas Trenchard in 1506. The principal centres of the manufacture of this kind of pottery were Delft and Haarlem. Of all fayence (before Wedgwood) delft has the thinnest and the lightest paste, as thin sometimes as the finest oriental and very sonorous. The potters of Rouen never painted figures in landscapes, but the ware of Holland was decorated by its best painters. A large proportion of delft was copied from the old Japan porcelain, both in form and colour. The three ringed bottles, the shapeless beaker, and the large circular dish are to be seen in most collections; and they well imitate both the pattern and the colour of the originals. This imitation oriental ware was covered with a bluish glaze or enamel, presenting a smooth surface. Marl or sand was mixed with the clay, in order to lessen the contraction in baking, giving

Delft vase.

also a lightness and hardness which had not been attained in any other manufacture.

The making of oriental looking delft was introduced into England by Dutch potters. Bristol, Lambeth, and Fulham appear to have been the sites of the potteries.

Stoneware, of ancient origin in the east, was probably first made in Europe in Germany, at Ratisbon, Cologne, and other places. It is a dense and highly vitrified earthenware, impervious

German ware; sixteenth century.

to the action of acids, and is formed of clay mixed with sand. The glazing is the actual material itself fused together, with the addition of salt thrown into the kiln. When broken it exhibits a close grey texture, is impermeable to liquid and resists the action of fire. It is of extraordinary hardness and will strike fire with steel.

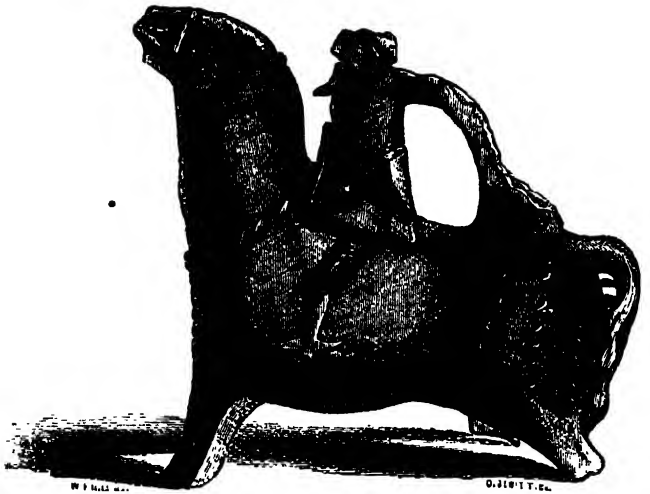
The brown stone pots known as greybeards were made in

great numbers, and exported to England and various countries. Another extensive class is designated as "Grès de Flandre;" but somewhat wrongly as it was rarely, if ever, made in Flanders but in some of the towns in Germany. Another class is remarkable for its beautiful blue colour, its quaint forms and rich ornaments. Very fine specimens of these different divisions are to be found in most of the national collections.

We come now to England, and have already spoken of the more ancient and ruder kinds; and of the Samian ware, which has been found in almost every place which had been occupied by the Romans, in the first century of the Christian æra. The next earliest specimens of decorative fictile ware which we possess are the ornamental tiles with which the old churches and abbeys were paved. These were probably of English workmanship, and are generally of better make and with more artistic ornamentation than the tiles which have been found upon the continent. Sometimes, these tiles were made in moulds with the pattern in relief; and coated with an uniform green or brown glaze. Sometimes, with such patterns in outline and of the same colour as the tile. Sometimes, with the pattern inlaid. This last is the most common variety. After the pattern had been impressed the sunk portions were filled in with white clay, and the whole covered with yellow glaze, producing a bright yellow ornament on a rich brown ground. Four of the old kilns have been discovered; at Bawsey, near Lynn; near Droitwich; at Great Malvern; and at Great Saredon, in Staffordshire.

The manufacture of ornamental earthenware does not appear to have been extensively practised in England during the middle ages. Fragments of pottery have been frequently found; but examples of perfect pieces very rarely, and it is hardly possible to appropriate them to their particular date. These have been discovered chiefly in excavations in London; and we can scarcely speak of them as works of art, being of homely manufacture and for domestic use. A very curious jug or ewer was found at

Lewes, in 1845; of a date as early, perhaps, as the reign of Henry the second. Occasionally reference is made to certain



Green ewer; found at Lewes.

kinds of earthenware vessels in mediæval inventories, such as pitchers and pots and especially the "crusekyn." This last seems to have been the best kind, and was in some instances so valued as to be mounted in silver. The word is still in use in Ireland to denote a small pot or cup. The "greybeards" were largely imported; and in James the first's time commonly went by the name of "Bellarmins." Jugs in imitation of these greybeards were made in England as early as the reign of queen Elizabeth: and in 1626 letters patent were granted to certain London merchants for the sole making of "Stone pottes, stone jugges, and stone bottells, for the terme of fourteene yeares." The same document declares that up to that time such things had been brought "out of foreign partes, from beyond the seas." Earthenware jugs were also made in France, about the year 1600.

Earthenware jug; French.

Delft and stoneware were not uncommon in England long ago, though it is not known where the first manufactures were situated. The earliest specimens are of the reign of Charles the first; white jugs; or wine pots, marked for "sack," "claret," or "whit." Occasionally they have dates: ranging from 1642 to 1659. Delft potteries were carried on at Lambeth until comparatively a recent period. The earliest document to which we can refer relating to stoneware is a petition addressed to lord

Burghley, in 1581, as to establishing such a pottery in this country. The troubles in the Netherlands, which drove so many industrious workmen to other places, probably induced also makers of different kinds of pottery to settle here. Whether any (even of the last years of Elizabeth) of the beautiful though plainly mottled brown stoneware jugs, which are found mounted in silver, were made in England is very doubtful: the mountings are undeniably English, and often richly gilt and of admirable design and workmanship.

Staffordshire, in which is the large district called the Potteries, has been immemorially celebrated for its earthenware. Some have traced the manufacture, in the shape of tiles and jars and jugs, through the times of the Dane and the Saxon up to the Romans. Be this as it may, we have in a book of household accounts of the year 1466, an entry of a payment of four shillings and sixpence by Sir John Howard, to one of the potters of Horkesley, for eleven dozen pots. There are examples still extant as old as the reign of Elizabeth, and dishes with the arms and of the date of Charles the first.

The names of many manufacturers of about the end of the seventeenth century are on record; the chief, perhaps, among them being that of two brothers, the Elers, from Nuremberg, who discovered near Bradwell a bed of fine compact red clay, which enabled them to imitate the red ware of Japan. For some years they kept the method of their process secret; but being discovered numerous establishments soon competed with them. The introduction of the salt glaze, one of the greatest improvements in the potter's art, is due to the Elers.

Josiah Wedgwood is the most widely celebrated of all English potters. When he began his career almost all objects of English origin for ornamenting mantelpieces and cabinets and window-sills were in a very rude state. Only rich people could afford to purchase Dresden or Chelsea china; and clumsily fashioned pots for flowers and coarsely modelled figures were the

only decorations of rooms in middle-class houses. Wedgwood was born at Burslem, in 1730, of a family which had carried on the manufacture for some years. About the year 1755 he succeeded in discovering the green glaze which covers the well-known and still favourite dessert plates and dishes with imitation vineleaves and fruit. In 1762 he produced the fine cream-coloured ware which gained him great reputation and was called *Queen's ware.* This is composed of the finest clays from Devon and Dorset, mixed with a due proportion of ground flint. In 1768 he took out a patent for encaustic painting "in imitation of the ancient Etruscan earthenware," and in 1769 opened the new manufactory at Etruria. In 1773 another improvement was made, "a fine white terra cotta, proper for cameos, portraits, and bas-reliefs:" this was the forerunner of the beautiful jasper ware.

Vase; Wedgwood; blue jasper.

This last was among the most remarkable productions of Wedgwood. It is a white porcellaneous biscuit of exquisite delicacy which has the property of receiving through the whole substance, from the admixture of metallic oxides, the same colours as the oxides communicate to glass or enamels. It is admirably adapted for all subjects which should be shown in relief. The ground can be made of any colour, whilst the raised figures are of the purest white. The cameos which were made are astonishing; nearly 1000 are enumerated in Wedgwood's own catalogue, all (it is said) taken from original gems lent for the purpose. For other works such as plaques, or vases, Flaxman supplied many drawings and models. The most important and valuable piece of Wedgwood ware is the copy of the famous

Portland vase, originally sold for fifty guineas each; and for which much higher prices have since been given. An example is in the South Kensington museum.

Other well-known potteries in England were at Lambeth, as far back as 1640, and at Fulham a few years later. Fulham stoneware is of exceedingly hard texture, very compact and covered with a salt glaze: ornamented with a brilliant blue enamel in bands, leaves, and flowers, often with medallions also.

Earthenware seems to have been made at Bristol as early as the reign of Edward the first; and there was a manufactory there in the time of queen Elizabeth. So also at Leeds, Yarmouth, and Lowestoft. At the last place, pieces of oriental white porcelain seem to have been painted with Chinese designs; but it is incorrect to attribute, as some are disposed, every doubtful piece of a certain quality and decoration to Lowestoft.

Before we speak of English porcelain it would be well to make a few remarks upon oriental porcelain; of China and Japan. We are unable to decide at how far back a date oriental china may have been brought to Europe. It is quite possible that the Romans, under the empire, may have had many specimens: nor is there any extravagance in supposing that some of the famous vases, spoken of by late authors and in a material about which we are uncertain, may have been Chinese porcelain. Before the beginning of the sixteenth century we find several passages in travels and histories which speak of the beauty and excellence of oriental china. The earliest known pieces in England are some bowls given by Philip of Austria to Sir Thomas Trenchard in 1506, and still preserved in the family. These are blue and white Nankin. Another is a pale sea green basin, of thick ware, at New College, Oxford, said to have been archbishop Warham's, about 1520; and later, in queen Elizabeth's reign, we have mention made in various records of "porselyn" and "Chinese stuffe."

The period of the first manufacture of porcelain in China is involved in complete obscurity: we must be content to allow it

a very great antiquity and admit that excellence was long ago arrived at. We cannot base any argument upon the little Chinese bottles found in the tombs of Egypt with remains of mummies, for these seem unquestionably to be of a much later time, and to have been fraudulently put there by the Arabs. On the other hand there appears no reason for disputing the official annals of the Chinese themselves, which have placed the invention some two hundred years at least before the Christian æra. The marvellously delicate and thin egg-shell vases, cups, and plates, appear to have been first made about the middle of the sixteenth century.

Oriental (Chinese) vase.

Many attempts have been made to classify the various kinds of Chinese porcelain; a task of extreme difficulty. The dragon, with five, four, or three claws, is a favourite subject of decoration; also, the kylin, the dog, the spotted deer, and sacred birds. The most beautiful colour is the turquoise blue; and really old examples are very rare; still more rare is the old violet. Yellow is the imperial colour; and a fine ruby is generally found on the highest quality of egg-shell plates. The old sea-green, the true céladon, is greatly valued and also rare. The crackle vases, when good and old, are always sought after: and though the cause of the crackles is shown to

be the unequal expansion of the glaze on the paste, we do not exactly know how they were produced.

The Chinese made wonderful porcelain: to which they gave innumerable forms and every gradation of colour. The decorative taste and skill of the artists of "the celestial empire" know no limits. Their chief aim was to imitate, with more or less capricious variation, some natural object. They studied flowers and fruits, beasts and birds, tree-trunks and empty shells, and refreshed the countless subtleties of their fanciful imaginations with the realities of existence. It is true that they had a tendency to the monstrous and the distorted which offends our educated eye and better judgment: yet, some may still argue that their grotesque dragons and reptiles, their fish and gigantic birds, are but traditional representations of animals which, according not only to eastern story but to the facts made known by modern science, once trod and crawled upon the earth or swam across the seas.

Japanese porcelain bears a resemblance to that of China, but with a little experience can be easily distinguished. It is a more brilliant white and the clay is of a better quality; the designs are more simple and the decorations less overloaded; the animals are not so monstrous, and the flowers designed more in accordance with nature. Japanese porcelain does not stand the heat of the fire so well as the Chinese.

The oldest kind of Japanese ware is of a quaint shape with curious embossed figures, painted on a white ground in red and blue, the paste not being of a good quality. The most perfect production is the fine vitreous porcelain, the paste of which is prepared with extreme labour. It is so white and thin as to be perfectly translucent; the glaze so equal and clear and so colourless that one can scarcely believe it to be the work of the potter. The specimens brought to Europe have been mostly cups, with covers and saucers. The red Japan ware is a fine unglazed stone-ware like that afterwards imitated at Dresden by Böttcher.

Some very beautiful ware was also produced in Persia, and decorated with metallic lustres. It is made of very fine white paste, and the ornaments in perfect taste. Hunting scenes are a common subject, and especially flowers.

Vase, Persian porcelain.

It has long been an English taste to collect fine oriental china: and this was greatly influenced by Mary, queen of William the third. The correspondence and periodical literature of the last century are full of allusions to the mania for buying pieces of china; and the more hideous and outrageous the forms were, so much the more it was said they were sought after. This is a mere exaggeration: the fashion was a good fashion; and nothing could be more decorative than "the piles of china," "the chaos of Japan," "the pyramids of cups," "or the costly jars," which were so much complained of by writers in the Tatler or the Spectator. Of late years, in common with other things, prices have rapidly risen for really fine oriental porcelain. Egg-shell enamelled plates which twenty years ago might have been bought for £3 or £4 cannot now be purchased for five times the money; vases and sets of small pieces follow in the same proportion; and the very tall jars, for which £200 used to be thought to be an enormous sum, are worth £1000 and £1200 a pair. But it must be remembered that these great sums are to be obtained only for porcelain of the true date and highest quality. The market has been flooded with

inferior stuff, and unwary collectors have been terribly imposed upon.

The first porcelain works set up in England were at Chelsea and Bow. There seems to be no record of the precise dates of their establishment, nor of the names of the proprietors. They probably began about the year 1730, were in full work in 1745, and existed thirty or forty years.

Bow china was made at Stratford le Bow. It is often embossed and of quaint devices. The quality of the clay is inferior, and the paintings, on a plain ground, flowers or landscapes in bistre. A bee was occasionally placed in relief or painted on the handle or spout of a jug. The early specimens of Chelsea were painted to resemble oriental porcelain, and show a rudeness and want of finish usual in the first stage of any manufacture. The custom among German princes to attach china manufactories to their court no doubt influenced George the second to encourage the Chelsea works. He brought models and artists from Saxony, and enabled Chelsea to produce articles which rivalled in excellence and splendour the best importations from Dresden. Horace Walpole speaks of a service which he saw, intended as a royal present, which cost £1200. The Chelsea establishment was finally broken up about 1780, and the workmen and the models were transferred to Derby.

The first forms of Chelsea china are in a great degree after the French models. The colours are fine and vivid, bleu de roi, apple green, turquoise, and especially claret-colour, which seems to be peculiar to Chelsea. Many of the cabinet specimens approach the best productions of Sèvres in colour and painting. The porcelain from the softness of its paste will not bear any fresh exposure to the heat of a furnace, so that it cannot easily be repaired or (as they say) "doctored." The embossed oval with a raised anchor is generally considered as the earliest mark; afterwards the anchor was simply painted in red or gold: the gold anchor has no relation to the quality of the piece. Fine

Chelsea vase.

examples of Chelsea ware, especially vases, are very valuable and fetch high prices.

The Derby manufactory was founded in 1750, and in 1777 Dr. Johnson said that the china was beautiful, but so dear that he could have silver vessels made as cheap as those sold there of porcelain. Derby china is very transparent, and is characterised by a bright blue upon the border or edge of the tea-services; the ground is generally plain. The figures are not equal to those of Chelsea; but the white biscuit figures rival the biscuit of Sèvres. The secret of the Derby biscuit appears to have been lost: but the Parian has sprung from it. The marks are various; and lists are given in books upon the subject.

Plymouth china is very rare, and some of the best specimens

have great beauty and excellence of workmanship. The manufactory was established about 1760, and hard paste porcelain was there first made in England. The usual ornamentation consists of flowers, butterflies, birds, and monsters in rich colours, and sometimes with much gilding. A not uncommon characteristic is a crack in the glaze. The manufacture lasted only about twelve or fifteen years, and the proprietor's patent right was sold and transferred to Bristol. Bristol china consists mostly of tea and dessert services, figures, and bouquets of flowers, in the style of Vincennes. The common ware is generally blue and white, the best is rich in gilding and painting. The groups are inferior to Chelsea but better than those of Plymouth. The best known mark was a cross. Bristol china is also very rare; from the same cause as the Plymouth, the shortness of the time of production.

The Worcester works were begun about the year 1750; and the invention of printing upon the porcelain was almost contemporaneous. The china made from 1760 to 1770 was of very superior quality, and the colours used upon some of the ornamental pieces approached closely to the Chelsea, often in imitation of Japanese. The marks are of great variety, but denote the changes that have occurred in the ownership or direction and enable us to ascertain the dates of particular examples.

The first porcelain made at Worcester was what is called a frit body; that is, consisting of materials which are fritted or melted together at a great heat in order to form chemically that which we have naturally in the porcelain clays. The proportions of the Worcester body were the result of the scientific investigations of doctor Wall and no other artificial porcelain excels it, either in closeness of texture or perfect union with the glaze. It is said that no piece of old Worcester has been found *crazed*: a fault arising either, as in Chelsea sometimes, from excessive thickness of the glaze or, as in Derby, from a defect in the body.

The gilding of porcelain has always been one of the most important features in its decoration; and the preparation of the

Worcester gold was remarkable, rivalling some of the best continental work. Vienna and Sèvres surpass it; not so much perhaps on account of finer metal or better preparation, but from the more artistic and richer treatment. The principal colours of old Worcester are the fine cobalt blue, ruby, opaque green, and turquoise: and the cobalt blue has always been an especial favourite. The maroon specimens are scarce.

Without mentioning less noted places where porcelain has been made in England we must be content to add that manufactories were established in Wales; at Nantgaru or Nantgarrow in Glamorganshire and at Swansea. The wares once produced at these places were perhaps equal in quality to any china hitherto made in this country. No expense was spared in procuring workmen or materials; and the want of success must be attributed solely to the deficiency of public patronage. Since the discontinuance of these establishments the excellence of the ware has been more justly estimated, and prices are readily given by collectors much greater than those originally demanded.

Dish; Moustiers ware.

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